

'Who does what' and 'who gets what'

Capturing the value from innovation

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The Advanced Institute of Management Research (AIM) develops UK-based world-class management research. AIM seeks to identify ways to enhance the competitiveness of the UK economy and its infrastructure through research into management and organisational performance in both the private and public sectors.

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Current AIM research projects focus on:

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National productivity has been the concern of economists, government policymakers, and corporate decision-makers for some time. Further research by scholars from a range of disciplines is bringing new voices to the debates about how the productivity gap can be measured, and what the UK can do to improve the effectiveness of UK industry and its supporting public services.

Sustaining innovation to achieve competitive advantage and high quality public services.

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Innovation is a key source of competitive advantage and public value through new strategies, products, services and organisational processes. The UK has outstanding exemplars of innovative private and public sector organisations and is investing significantly in its science and skills base to underpin future innovative capacity.

Adapting promising practices to enhance performance across varied organisational contexts.

How can UK managers disseminate their experience whilst learning from others?

Improved management practices are identified as important for enhancing productivity and performance. The main focus is on how evidence behind good or promising practices can be systematically assessed, creatively adapted, successfully implemented and knowledge diffused to other organisations that will benefit.

The issue of who benefits from innovation is a complex one. The answer is not always the innovator. It may be other firms that are needed to get an innovation to market (complementary assets), or even those who produce imitations and adapted versions of the original innovation.

For the innovator the usual advice is to try to protect the innovation as tightly as possible, usually through intellectual property rights and, if this is not possible, consider taking on other parts of the innovation value chain. Don't just create the innovation, but design, market and sell it, for example. Our research, however, shows that innovators have more options than this, new strategies that they can employ to ensure that they capture the most value possible from their innovation.

Instead of innovators being narrowly focused on the nature of their relationships with complementary assets, and who gets what out of those relationships, they must look at the broader picture of the economic network they operate in and their influence on that network: In other words, they may be able to *shape their sector's architecture*, allowing them to benefit without needing to integrate throughout the production process – ruling without assets, like Microsoft or Intel.

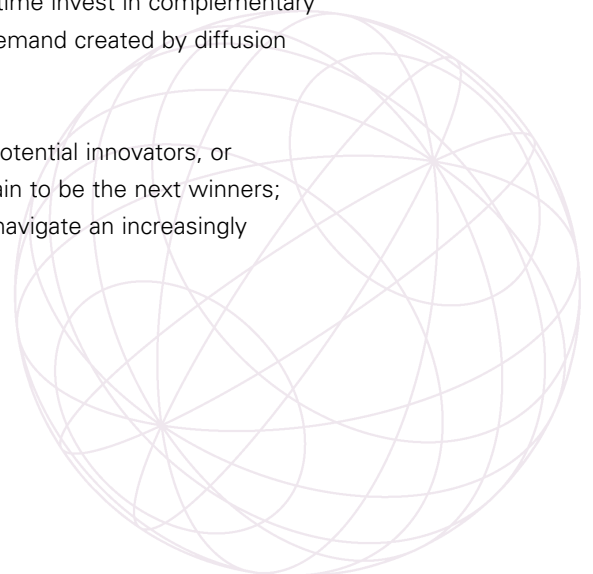
To do so, firms should consider their relationships with other innovation partners in terms of *complementarity* – how good the fit is, in terms of how much value it creates – and *factor mobility* – how interchangeable is the other specialised firm – as this partly determines the innovators share of the innovation value pie.

Innovators and firms more broadly can benefit from manipulating the industry architecture in such a way that they become points of scarce resource, or bottlenecks. To do so, firms may want to influence industry standards, de facto exclude other players through making *their* expertise indispensable, and by inviting fierce competition in the segments they are *not* active in. They may want to redefine markets by bundling products together, changing the nature of competition to fit their own advantages.

Also, we argue that beyond manipulating their sector, innovators can find other ways to prosper. Surprisingly, it may even be that the best play for an innovator is to encourage imitation of the innovation, and at the same time invest in complementary assets, which will then appreciate in value due to the demand created by diffusion of the innovation.

Our report provides a simple framework to help guide potential innovators, or firms considering how to best position in their value chain to be the next winners; we provide two decision flow-charts to help managers navigate an increasingly complicated industry ecosystem.

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introduction: the challenge of capturing value

Innovation is often cited as a core competence for modern firms. Few firms, no matter what business they are in, can achieve sustainable success without innovation – whether product, service or process innovation. There are, however, considerable risks and uncertainties attached to it.

More important, firms have to address the question of *value capture* – the ability to find effective ways to capture the returns to an innovation, to compensate for the risks taken and reward superior ideas. Unfortunately for innovators, there is no guarantee that they will extract all or indeed any of the value flowing from their innovation. For many reasons, it may not be the innovators who reap the rewards of innovation. The way in which Microsoft and Intel captured much of the value in the PC market at the expense of IBM and Apple, is a good example of how some innovators, and players in some parts of the value chain can lose out, whereas others can capture a commanding position.

Given how important the challenge of value capture is, a substantial body of knowledge has developed to guide managers and policymakers. Researchers and policymakers have considered how innovators can capture as much of the value of innovation as possible. And, in doing so, they have helped provide a strong incentive for innovation – an essential activity for the prosperity of any economy.



Received wisdom on this topic, we argue, is valuable; but it also misses some important dynamics. The current state-of-the-art is to focus on the contractual conditions surrounding the innovation and innovator – how easily the innovation is to protect, for example – as well as the nature of the relationships between the innovator and other parties required to squeeze value out of an innovation.

For example, when Henry Ford had revolutionary ideas both in terms of automobile design, and automobile production processes, he could not capture their value without manufacturing and marketing the car. Had he lacked the means to manufacture the car, another firm would have had to step in and take on the manufacturing role. And a couple of related issues would emerge: With the other company needing to tailor its production to Ford's ideas, how would the risk be shared? And would it make sense to be exposed to such a risk? And, if this venture worked, how would the two parties negotiate for sharing the gains?

In such a situation the assets that are put together are said to be co-specialised. Co-specialisation is where firms come together in a synergistic fashion and, by combining resources, are able to create greater value together than either could independently. The synergistic nature of the relationship means that there is a mutual interdependence. Take sea containers for example. The economist would refer to this property of a relationship as economies of scope. When they were invented, shipping ports had to be adapted to enable the innovation of containers to be exploited.

In a situation of complementary assets and co-specialisation – 'who does what' – there is still the question of 'who gets what'? Research has suggested in the past, that the best situation for the innovator is one where they are able to control appropriation of the innovation. That is, protect it, and restrict others from using it. In such a case the innovator is well placed to benefit from the innovation it would seem. If, for instance, Henry Ford could take a strong patent for his ideas, he would not need to build a car company; he could license or sell his invention to any manufacturer.

But what if the innovator is unable to prevent appropriation? In this case common sense suggests it might be a good idea to own the complementary assets required to extract value from the innovation. However, there remains the question of weighing the benefits of capturing value in this way against the costs of entering into a section of the value chain where there is no prior experience.

Without the means to do this, the remaining option might be to enter into a contractual relationship with co-specialised assets in the value chain. This means handing over some of the value and then there is an obvious risk that not only will the innovator get a much smaller proportion of the value but they might lose control of the innovation altogether and miss out entirely.

Common sense, and what might seem obvious, however, is not always a very good guide to the best course of action. And, as it turns out, this is the case with innovation.

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relationships in the innovation value chain

Research in this area has tended to focus on how mutual dependencies between two agents in the innovation value chain, influence who benefits when an innovation comes to market. Mutual dependencies among economic agents are not just bilateral, however. Consequently, the understanding of both industry dynamics and of how firms can profit from innovation, is enhanced by shifting focus to industry-wide networks of relationships. One of the major findings in our research is that much can be explained by looking at the structure of these industry-wide sets of dividing labour.

The complex structure of co-specialised agents and assets across a sector can be described as an industry *architecture*, and defines the terms of who does what. It is clear from the way that fairly similar tasks are organised in different countries that there are many different ways to 'chop up' the production process, and define roles and interactions. In the construction industry throughout the European Union, for example, very different ways of organising a set of co-specialised firms have emerged in countries with similar levels of development. That means that in each country, a different *architecture*, a different way of organising production emerges. The exact nature of this architecture, we find, also affects the ability of firms to profit, and to benefit from their innovations.

Architectures provide the templates, the framework within which actors interact. They are powerful and constrain what firms do in ways that might not be immediately evident. They are usually partly designed – by regulation and by standards, for example – and partly emergent through the creation of socially understood templates that help to make business happen.

Architecture

'Architecture', in this context, is an abstract description of the economic agents within an economic system and the relationships among those agents in terms of a minimal set of rules governing their arrangement, interconnections, and interdependence.

1 Why do architectures emerge in the first place, and what do they do?

If architectures are important, and provide the frames that determine and constrain business action, it is worth considering the question: Why do they emerge in the first place? And why don't players who are not favoured by these architectures just ignore them altogether? Architectures are shaped in number of different ways.

(i) Architectures through Industry Evolution and emergent design

Architectures evolve. With the birth of a new industry, a range of possible architectures may be viable. Gradually, as an industry architecture becomes stable, a system of interfaces – the technological, institutional, or social artifacts that allow for two or more independent entities to divide up who does what – emerges. Interfaces are both the catalysts and the evidence of co-specialisation between players. They can emerge through conscious action or through happenstance.

In service sectors, interfaces often consist of regulatory frameworks that determine what each segment is allowed to do, and how different segments in a sector connect. In technology sectors interfaces consist of technological specifications that allow different players or constituents to connect. Technological interfaces, in particular, can be proprietary, such as the USB Flashdrive interface, or open, like other parts of the PC architecture. The system of interfaces moderates a set of firms whose functions are co-specialised so that their interaction is based on a well-defined distribution of roles.

(ii) Industry architectures and network effects: Follow the winner

Industry architectures also solidify when a particular 'business ecosystem' works; once a set of mutually compatible firms come to dominate the business scene. Once a promising way of organising transactions in a sector emerges, it is likely to be followed by a number of players to the extent that they can avoid transactional investments in making things happen. Often, as 'winners' emerge in some parts of the value chain, because of their idiosyncratic, superior capabilities, potential upstream suppliers or downstream retailers come to co-specialise. Thus, an industry architecture emerges on the basis of the interfaces defined by firms that initially happen to hold superior capabilities, in terms of technical efficiency.

Once a promising way of organising transactions in a sector emerges, it is likely to be followed by a number of players...

The stability of such a system increases with positive feedback from current operations and negative feedback from trying to change the architecture. This results in one, or, at most, a small number of rival 'platforms', co-specialised 'business ecosystems', with their own sponsors, orchestrators, and keystone members. Just as happened with the Betamax and VHS video standards, and is happening in the DVD market at present with Blu-Ray and HD-DVD. With highly specialised members of an industry architecture connected in ways that minimise transaction costs, the cost of changing the architecture single-handedly is likely to be substantial.

(iii) Consciously shaping architectures by legal and regulatory authority

Industry architectures, are also shaped by legal and regulatory authority, and this explains why in different states or countries, the 'who does what' part of the innovation value equation is structured differently.

Understandably, industry participants who stand to benefit from a given architecture usually fight the introduction of new alternatives through legislative or regulatory means. In many sectors today, including healthcare, financial services, public services, political forces and lobbying can play a substantial role, not only in supporting any one architecture, but also in discouraging alternatives. Firms or industry associations spend substantial effort trying to manipulate these rules, in battles which not only define 'who does what' but also, and more importantly, 'who takes what'.

Industry architectures also emerge or change whenever new ways are found to 'put together' the various industry participants: Legal innovations that alter transaction costs, such as broadband auctions; new ways of safeguarding against loss from transactional hazards, such as electronic monitoring; and technical innovations that alter the payoff to bundling specialised production factors, such as the assembly line; these could all inspire adjustment of an industry's architecture.

(iv) Verifying quality: How final consumers make architectures stick

Another critical issue that induces stability and adherence to a sector's architecture is the challenge of verifying quality. Arbiters of quality, provide essential confidence and stability in a market. Companies will fight for the privilege of providing this guarantee of quality as it confers considerable power to capture the value of innovation.

Wine trading in the 18th to 20th centuries provides good illustration of this point as different participants along the value chain, with a distinct view of how the industry architecture should be structured, fought to be the guarantors of quality.

In Port wine, the shippers of wine, prosperous merchants such as Sandeman or Warre, managed to gain the trust of the public, and as such managed the architecture of the sector around that reputation. In the French Claret market, the producers backed by the French government and hefty advertising, were able to relegate the importers to an actor of lesser importance, not only in the eyes of the regulator and the consumer.

Try as Port growers might to change the architecture, it was very difficult to displace the old architecture, precisely because of the inherent information problem, which was, in the eyes of the consumers, being tackled by the shippers.

The struggle between Intel and PC manufacturers can be viewed in a similar light, the key question being, 'who will be the guarantor of quality in the emerging PC sector structure?' In each case, different parts of the industry will try to keep this 'certification' function for themselves, yet their desire to be the 'guarantor' will not always be successful.

A number of distinct architectures are therefore possible; different ways in which roles are distributed among a set of interacting firms. But once an industry architecture emerges and stabilises, it is difficult to stray from it, for reasons relating to interoperability – who else is willing to participate in a new architecture, or is capable of doing so; regulation – which reinforces some ways of dividing labour and excludes others; and information – what the customers have learnt to expect.

(v) What architectures do to firms: Setting two templates

Thus, industry architectures provide two templates, each comprising a set of rules:

- a template defining value creation and the division of labour, i.e. who can do what;
- a template defining value appropriation and the division of surplus, or revenue, i.e. who gets what.

These templates are related. Co-specialised ways of carrying out production are related to rules of dividing surplus, i.e. the organisation of payments for services and goods.

2 How to assess relationships *within* an architecture

So the question of 'who does what' is related to the question of 'who takes what', and it may be that shaping the architecture can be, in and of itself, the bone of contention. But, how can we assess the relations between different participants in a sectors' architecture?

Research to date has suggested that co-specialisation of the assets will determine how a firms' position in the value chain will be linked to its ability to appropriate value from the innovation it comes up to. Existing theory suggests that if the Intellectual Property Rights aren't strong there will not be a problem – our research challenges this contention. If IPR are not strong, it depends on co-specialisation. If all a firm needs to bring the innovation to market are generic assets or services, then superior returns to innovation can be gained by drawing on markets for assets, inputs, and services. If co-specialised assets are needed then its possible the holder of the co-specialised asset may be the one walking away with the profits.

In this section, we will revisit this piece of received wisdom, and argue that to better understand how co-specialisation works, and see how different players in a sector are more or less advantageously set, we need to dis-entangle the construct of co-specialisation into two constituent parts that seen separately can yield better prescriptions. We will then focus on the role of *relative mobility within an industry architecture*, before turning to the broader question of how to profit from an innovation.

(i) Co-specialisation: Complementarity and mobility

Co-specialisation, we argue, can be taken as two distinct components: complementarity and mobility. Consequently each component can be managed separately to the benefit of the innovator.

- The first issue is bilateral dependence in the sense of superior returns to a combination of two or more assets, i.e. complementarity in products, services, and processes.
- The second is bilateral dependence in the sense of the number of assets that can potentially enter a combination, with negligible switching costs, i.e. mobility in assets that are components of a combination.

Size of the total innovation pie: The notions of complementarity and mobility are best treated as independent aspects of co-specialisation because they capture distinct economic effects. Complementarity influences the size of the value to be bargained over: some combinations yield higher value, others lower value, depending on the 'fit' of the things to be combined.

Share of the innovation pie: In contrast, mobility influences the bargaining power of the asset holders, and thus the division of the value, some assets cannot be replaced, whereas other assets can be replaced by numerous equivalents at negligible cost. Reduced mobility may be due to a variety of factors; for instance, it could be due to the existence of 'Endogenous Sunk Costs' (ESC), e.g. to large advertising or R&D budgets, or network externalities which make it hard for existing players to replace each other or for new players to enter.

Even if there is tight intellectual protection of property rights, it is unclear how much value will be captured by the innovator.

(ii) Why relative mobility within an industry architecture is important

Mobility plays an important role in determining the relative bargaining positions of two parties, regardless of their complementarity. That is, the smaller the relative mobility in the part of the architecture where a firm is active, the greater the ability of that firm to benefit. The aim of a firm that innovates, then, is to be unique and indispensable, which can be achieved by high complementarity, but also to be the one that captures the value of this uniqueness, which it can do *by reducing its own relative mobility, or increasing the mobility in the segments where it is not active*. That is, a firm may want to reach controlled complementarity, high in both mobility and complementarity, allowing a firm to 'rule without assets' as Intel did it.

So firms might want to actively inspire substantial mobility in the complementary assets, as this might induce freer competition and entry in these assets. In this sense, innovators may have a richer set of choices. First, they might pursue complementarities without fearing that limited mobility is an inescapable consequence. Second, rather than just accepting the trade-offs as given, they may try to actively shape the menu of choices they face, by re-shaping the industry architecture.

(iii) How separating complementarity and mobility revisits old advice

Previous research suggests that tight intellectual protection of property rights coupled with co-specialised assets places the innovator in a strong position to capture returns from its innovation. On the other hand it is suggested that a weak intellectual property regime coupled with co-specialised assets is the least promising in terms of profiting from innovation. This leads to the conclusion that loose intellectual protection of property rights means the innovators should move into the co-specialised assets.

Separating co-specialisation into the distinct components of complementarity and mobility, however, changes this position. Even if there is tight intellectual protection of property rights, it is unclear how much value will be captured by the innovator. If, for instance, there is substantial downstream mobility, the competition in the downstream market will ensure that the upstream user captures a solid return from the innovation. Conversely, with limited mobility, intellectual protection alone is not enough to ensure a high payoff to the innovative effort.

Finally, our argument suggests that it is *relative mobility*, as opposed to Intellectual Property Rights (IPR) that matters: IPR means that an innovator can obtain *some* price for an innovation sold downstream. Yet relative mobility, i.e. the extent of competition downstream will affect *just how high* that price might be.

benefiting from innovation

Returning to the issue of innovation and how to benefit from it: Why should an innovator care about industry architecture or the precise composition of its relationship with other players in capturing value from an innovation? How does this relate to the innovator benefiting from the innovation?

1 Creating architectural advantage

They may not realise it, but innovators often have substantial opportunities to shape the architecture around them, and think strategically about how to organise roles of other participants and the ways in which they are connected.

Even small, budding entrepreneurial ventures can achieve a comfortable position in the industry architecture by influencing the structure of their sector in ways that would eventually fit their own capabilities. Managing or influencing an architecture can allow a firm to capture a disproportionate amount of the benefits created by an innovation, especially because innovations often require, justify or legitimise, the creation of a new architecture.



Opportunities for changing the architecture thus emerge in new sectors, for new technologies, or whenever a substantial technological, institutional or demand discontinuity allows for the reorganisation of production. The dynamics of architectural adjustment create new possibilities for gaining an advantage from innovation in a way that emphasises dynamic efficiency over control.

It is possible for the innovator to control complementary assets, assuming the company's cash position allows it to, and some suggest that this is one way for the innovator to avoid some of the problems of others appropriating value. This implies that the costs of setting up or controlling a new operation in terms of complementary assets would be well spent.

Here there is a judgment to be made on whether the loss of efficiency sacrificed by not using an experienced operator is compensated for by the value of controlling complementary assets in a new line of business. Losing control of an asset that is part of an innovative combination can be costly. If the combination is unique, the innovator's innovation partners are likely to extract a high premium from the innovator if they have little competition (in other words if the complementary assets are immobile).

A dynamic consideration, however, must include an assessment of the extent to which choosing to minimise the current loss of value through control, may impede the future ability of the overall platform or vertically co-specialised players – the new, vertically co-specialised ecosystem – to fend off any competing set of vertically co-specialised ecosystems. The innovator wants its architecture to prevail over the long term.

In other words, given scarce resources, does it make sense for an innovator to keep the biggest part of a potentially shrinking pie, or a modest part of a growing pie? Focusing excessively on value appropriation can impede value creation.

(i) From co-specialisation to bottlenecks

Firms can benefit from innovation by managing the industry's architecture carefully so they become the 'bottlenecks' of their industry.

A bottleneck is the part of the firms' or the industry's system that is in most scarce supply. Take the personal computer (PC). Although all 'IBM-compatible' parts of the value chain are, in effect, mutually adapted, the resulting dependencies are not symmetrical.

The inequality in the relationships is not caused by the technical attributes of any one of the PC components, or the interchangeable nature of Intel chips. Instead dependences arise from bottlenecks. The de facto exclusion of possible producers limits entry into particular segments of the industry architecture, whereas in other areas mobility is high, both in terms of switching costs and potential entry.

To appreciate this, though, we have to look beyond any relationship between two firms, and consider the entire system of mutually adapted relationships within the industry architecture. What are the dependencies in the entire IBM-compatible PC sector? Clearly, this is a case of almost one-sided asymmetrical dependency where Microsoft and Intel have managed to impose de facto dependency on all other players in the sector. How could this happen? Largely because entry into these two segments is very difficult. An attempt to challenge Microsoft or Intel in their own segments would require huge sunk investments. In contrast, entry and active competition in the other segments is much easier.

If a firm has an architectural advantage, it can afford not to care about protecting or investing in complementary assets.

Bottlenecks (i.e. segments where mobility is limited and competition softened), then, not only drive the direction of innovative activity, but also determine how an innovative combination creates and distributes value. This highlights the role of the shifting battleground of architectures at the level of industries and technologies.

What Intel and Microsoft have done, through a process of tough co-opetition is to shape the architecture of the PC sector. Through a judicious use of standards, they facilitate entry and competition that doesn't cross their core activities (the complementary assets), without participating actively in these parts of the value adding process. So the success of Intel and Microsoft can partly be attributed to the creation of convenient rules of the game that ensure they will end up with the lion's share of the benefits, although their activities have been joined with many other parties. In other words, they have focused on achieving architectural advantage by nurturing complementarity in an emerging open ecosystem. This allows for ferocious competition in the complementary assets rather than in their own segments.

(ii) Architectural advantage through standard bearing

Given the recent rise of opportunities to engage in creative restructuring of business models through outsourcing, the question of how a firm can get architectural advantage becomes an important issue.

If a firm has an architectural advantage, it can afford not to care about protecting or investing in complementary assets. Instead it should focus on maintaining its advantage by holding on to one part of the complement while increasing mobility in the other part.

Intel, for example, has been able to leverage its upstream position by carefully structuring its relationship with other industry participants, and especially Microsoft, as well as making its product more 'visible' through branding. Intel has accomplished this without downstream integration into production of personal computers. Rather, Intel used the structure of complementary assets to enhance its downstream demand.

Consequently, firms should be leveraging their position in complementary assets; not through changes in any one two-way relationship, but through the manipulation of rules defining who can participate, and thereby structure the incentives and powers that determine appropriability.



...it still appears that many industry participants are not fully aware of the competitive implications of changing architecture.

This explains recent struggles for industry and technology standards. Standards not only promote greater interconnectivity, but also open up one part of the value chain to competing companies that align with the requirements of the 'standard platform'. Standards shape industry architectures. They can be used to manipulate the mobility, competition, and entry into complementary assets.

Changing or setting architectures is no easy feat; and it is more likely to be effective either in the formative years of an industry, or when institutional change becomes possible. Setting an industry's architecture is very rarely a choice that any one firm faces. It often involves a great variety of players that need to converge, often through a contentious process.

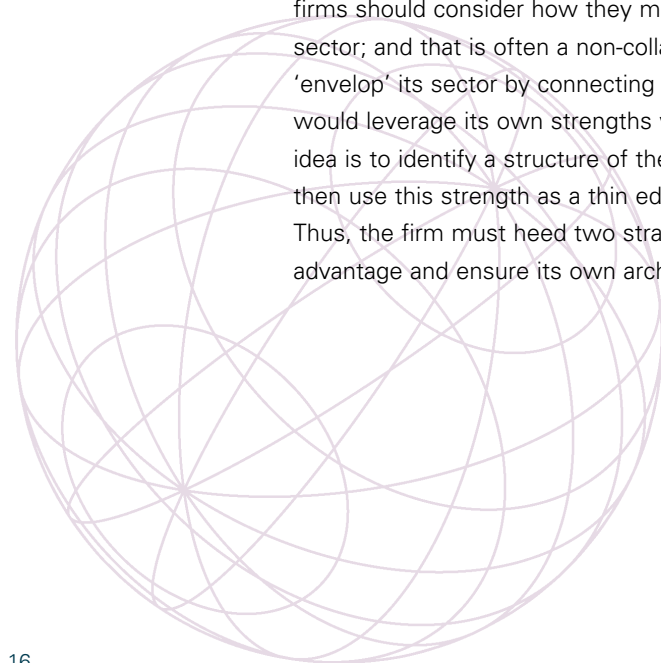
Only in exceptional cases do firms have the luxury that IBM had in the 1980's – to almost unilaterally shape the PC sector's structure. More often, the sector emerges through a trial-and-error process with several firms engaging in cooperation and competition at the same time. Yet while firms cannot immediately and unilaterally decide the nature of their industry's architecture, they still have the possibility of making a substantial impact. More important, it still appears that many industry participants are not fully aware of the competitive implications of changing architecture.

(iii) Changing architectures to fit your capabilities and resources

So a firm may want to try to change the architecture of its sector, helping shape standards to encourage competition in its complementary activities, while restricting mobility, entry and competition in its own segment. In that regard, becoming the 'guarantor of quality' in the eyes of the final consumer is often a critical factor, as IBM painfully found out after Microsoft and Intel became the de facto signals of quality, and after other PC components became standardised.

To do so, firms, small and large, established and nascent, will often engage in alliances and other collaborative efforts in order to affect the paths of industry evolution.

In addition to building mobility in other vertical segments within their architecture, firms should consider how they might strategically re-shape the structure of the sector; and that is often a non-collaborative game. For instance, a firm may want to 'envelop' its sector by connecting to a broader bundle of services and products that would leverage its own strengths while muting those of its competitors. The basic idea is to identify a structure of the sector where the firm has one key strength, and then use this strength as a thin edge of the wedge to gain architectural dominance. Thus, the firm must heed two strategic imperatives: it must both attain architectural advantage and ensure its own architecture can dominate.



Music wars

Consider the digital music distribution sector where Real Networks initially secured architectural advantage by focusing on the bottleneck in the value chain, which happened to be the file format. Microsoft soon enveloped it, using its own installed base, by providing a streaming media server as a bundled product with all the other server components. Real Networks, however, also used its ability in streaming, and expertise for music downloads, to re-position its offering as a music subscription business. As a result, Real Networks for a brief period became the dominant player.

However, this architecture was attacked by Yahoo, which again enveloped Real Networks by addressing a different, broader set of customer needs, on the basis of its proven advantage (internet subscription) which secured limited mobility. This effectively re-cast the architecture of the sector in a way that leveraged its own strengths while muting those of Real Networks. So fights on 'what the industry consists of', 'what are the players', and 'how do we compete', and 'who can envelop whom' drove the nature and structure of the industry.

In mobile music downloads, a related, but distinctive market, architectural strategy has played a pivotal role. Apple, with 70 percent of the market as of mid-2006, has kept the key position in its own architecture, ensuring there will be no challenge in the key part of its value-added process. At the same time it has encouraged the development of an ecosystem by using outsourcing partners, or even other OEM's like Bose, to draw the architecture around the iPod and thus attempt to maintain architectural dominance. Yet the battle for architectural dominance in this sector still looms large.

Other players, like Cingular/Verizon, are trying to use access to mobile devices and their subscribers as their thin edge of the wedge. Their intention is to either change, or create their own architecture for the musical downloads or subscription sector.

A deeper understanding of industry architectures, can be used as a basis for advising companies that want to maximise the control of their industry, and fight for their ecosystem's growth. Firms must be more strategic as they face the structure of their sector, focusing on the dynamics of their architectures.

Such an approach might also serve policymakers as a rough guide to maximise innovation, and eliminate firms that hold an excessive architectural grip over any one sector.

2 Thinking the unthinkable: Creating value by promoting imitation

What may be difficult for the innovator to come to terms with, is the fact that an effective strategy for creating and capturing innovation for an innovation may, perversely, not be to take to steps to protect and innovation, but instead to encourage imitation of it.

(i) Benefiting from innovation: The 'traditional' focus on profit

Consider an innovating restaurateur, who creates value both by inventive cooking, and through a talent for spotting trendy industrial post-modern chic properties that can be spruced up at a modest cost, and then turned into a restaurant.

There is complementarity between the cooking and real-estate identification. Doing both together creates more value for the restaurateur than doing either separately. There is also complementarity between investment in real-estate and the restaurant business; the restaurant provides value to the locale; and the locale is specialised to the particular aesthetics and style of the restaurant.

In terms of extracting value from the innovation restaurateurs might be expected to try to secure intellectual protection of their new concept...



In terms of extracting value from the innovation restaurateurs might be expected to try to secure intellectual protection of their new concept, in an attempt to exclude others from using the same style. Then the restaurateur would be safe to enjoy the profits from inventive efforts, and license the concept to others.

If imitation could not be prevented, though, traditional analysis suggests the restaurateur might need to get into the real estate business (accessing downstream assets). Given easy access and plenty of cash, this would be no problem, especially as less people would be as likely to imitate the combined bundle (i.e. restaurant concept and specific real-estate) than the restaurant concept alone, which is incapable of protection.

So the optimum solution for the innovator might seem to be the least imitable solution, allowing them to enjoy the fruits of superior profitability until the advantage gets emulated and eventually erodes.

(ii) From profit to asset appreciation

The problem with this approach to innovation is its focus on barriers to imitation, and the idea of 'strategy as attempts to fortify the fortress'. This distracts from considering alternative sources of value to the customer, as well as identifying alternative sources of profiting from a superior idea or skill.

Instead of considering the best way to protect the innovation, the restaurateur could consider the different ways to benefit from the innovation; more than just through operating profit. A restaurateur can also make money by increasing the value of the assets in hand. Identifying a new area and helping create a trendy restaurant that earns superior profits (the extra returns earned in the restaurant business due to the fact that the restaurateur cannot be copied or emulated), will also affect the value of the underlying asset – the restaurant.

The bottom line is, over and above the changes due to the increased profitability related to whether or not the innovation is easily appropriated, innovations present new opportunities to benefit from appreciation of the underlying assets.

(iii) Change of perspective: Benefiting from imitation

For entrepreneurs who carve out competitive positions by securing assets that are likely to appreciate, imitation may be a good thing rather than a bad thing. In the presence of imitation, an innovator can profit by investing in the complementary asset – such as real-estate in the case of the innovation of placing a chic restaurant in ex-industrial areas – before the imitation fully diffuses. The opportunity to benefit from asset appreciation can more than outweigh any losses of operating profits.

When aiming to maximise profits firms should include considerations of wealth creation. In doing so firms should trade-off how actions that can decrease profits, such as imitation, can increase the value of their assets. For instance, it is wise for the restaurateur to buy up assets that can be converted into restaurants so long as there is a limited supply of appropriate ex-industrial sites, and the value of these sites will rise sufficiently after the new restaurant is established. Additionally, for the restaurateur to be interested in investing in these sites rather than doing the whole thing (from building to concept), there also has to be some constraint (cash, capacity, or even time to convert the properties) that makes investing in the complementary assets (labor the property) more profitable on the margin, than providing the integrated offering.

Once we accept this shift in attitudes, a new set of predictions and prescriptions present themselves. This subtle shift of mindset from 'profit' and isolating mechanisms, to 'wealth creation' and the potential for asset appreciation, can yield a very different set of predictions and prescriptions.

towards a comprehensive framework

This section provides a new prescriptive framework to help a firm manage its boundaries so as to benefit from innovation.

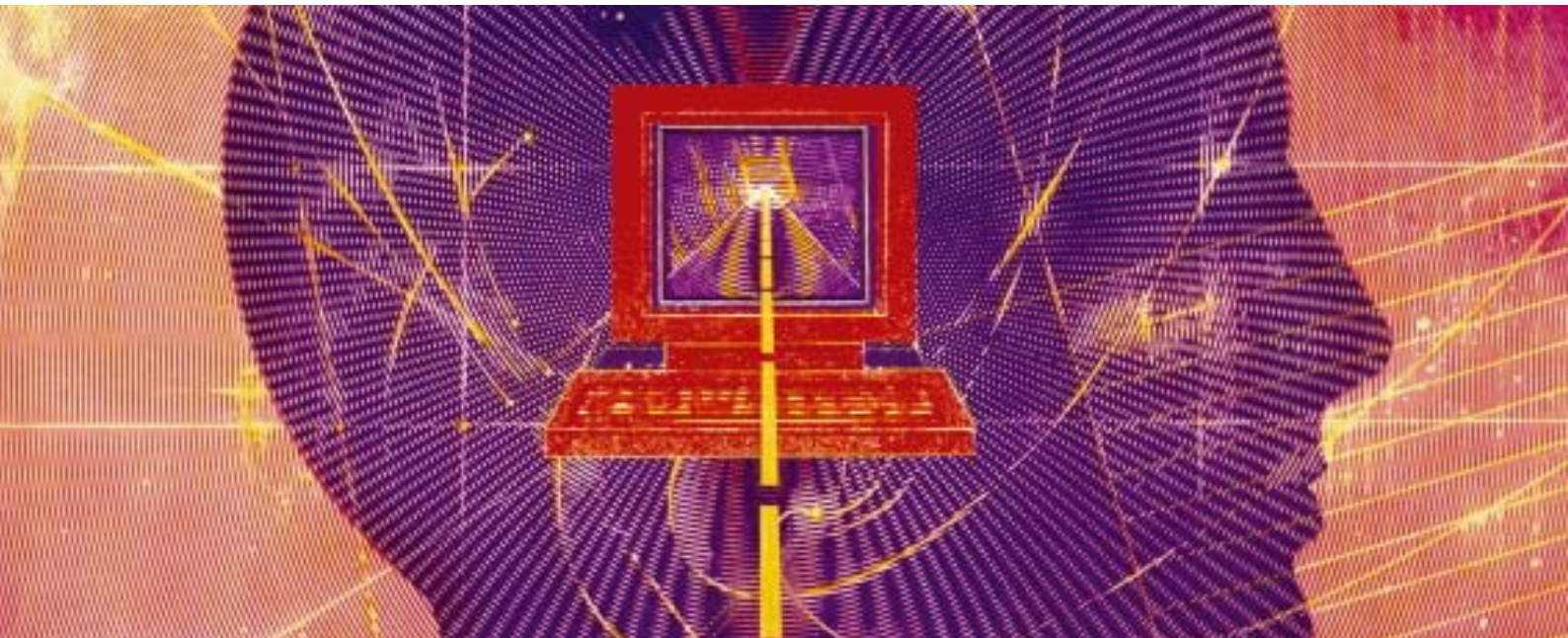
First an innovator should engage in a net assessment of architectural advantage versus integration. The relevant strategies for the innovator relate to:

- vertical mobility;
- shifting the focus of the business model;
- the choice of contracting versus integrating.

Next the innovators should consider the potential benefits from innovation through investment in associated complementary assets. An innovator should extend considerations of architectural advantage versus integration by engaging in a net assessment of operating profit versus asset appreciation.

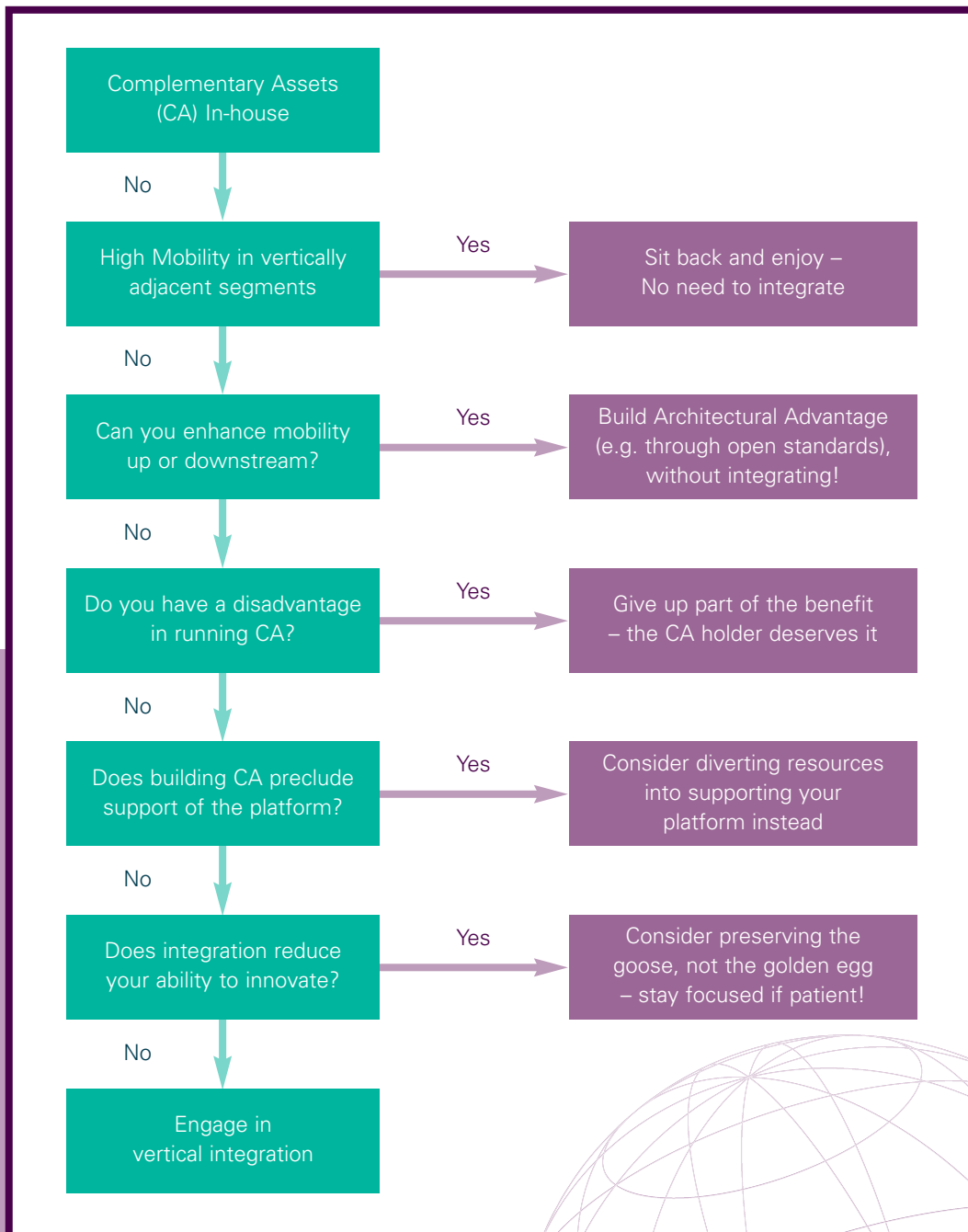
1 Architectural advantage versus integration

Figure 1 shows the strategies available to a profit-seeking innovator in the form of a decision flow chart.



The range of strategies is broader than a straight choice between contracting and integrating. It provides a broad assessment of the possible gains from architectural manipulation net of loss from weak intellectual protection – a fresh set of prescriptions, guiding firms as they choose their scope. The left hand-side contains the questions to be answered, and the right hand-side contains the corresponding advice.

Figure 1: Choosing scope to maximise profits: The role of architecture and capabilities



Possession of intellectual property rights is not necessary or sufficient to capture the full returns possible from innovation.

(i) Mobility as a key driver of success: Managing your architecture

First, innovators should assess the relative mobility of the asset which is controlled and the complement which is not controlled. Relative mobility drives the division of surplus; the more competitive and mobile the complementary asset, the higher the returns, for any given level of intellectual rights protection, of the innovation. If there is sufficient competition in the complement, innovators confronted by weak intellectual property protection would not need to access the specialised complementary assets and/or capabilities but can sit back and enjoy the fruits of their bargaining power instead.

A firm can benefit to the extent that it can enhance mobility in vertically adjacent stages, without needing to reduce the level of complementarity. An innovator that grasps this argument may obviously try to achieve architectural advantage by stimulating ferocious competition in the complementary assets rather than in their own segments.

In this way, firms can gain architectural advantage by shaping the structure of the industry around the needs of their own innovation and of their current position. Especially for nascent sectors, an effective process of early brokering and positioning can lead to the creation of a very profitable platform. Thus, if there is an unrealised potential for high mobility in the complementary asset (up- or downstream mobility), firms should aim to build architectural advantage without integrating.

Alternatively, firms might want to consider how they can challenge the dominant architecture of their sector by enveloping the previous architecture – by creating a broader bundle that can encompass more, or different value-adding stages, much like Yahoo enveloped Real Networks, or how Microsoft is currently trying to envelop Apple in the digital music distribution business. Either way, the focus is on how a sector's architecture can be profitably managed.

Possession of intellectual property rights is not necessary or sufficient to capture the full returns possible from innovation. A firm must therefore consider the mobility in its vertically related markets in order to assess the risk of value capture. A careful use of 'mobility dynamics' can be used as a strategic weapon, and this can benefit the innovating firm even in the presence of strong protection.

(ii) Shifting the focus of the business model

Second, innovators should consider if they would benefit from maintaining a narrowly focused business model even in the face of loss from unprotected intellectual property, or if they should broaden the focus and invest in supporting their platform.

Maintaining a narrow focus is favoured when, given the existing set of resources, and capabilities, the costs of developing complementary assets are excessive. Firms must not just think about the strategic entry cost into the new area, but also about their ability to emulate the capabilities required for efficient operation compared to experienced operators in that area.

The development and efficient operation of complementary assets should not be taken for granted. Careful attention must be paid to the costs needed to develop and manage complementary asset positions. It is not quite as simple as saying that 'moving into that area', presumably, through greenfield expansion or mergers and acquisitions, will resolve the problem with complementary assets. Consequently, the costs of developing complementary assets are an important determinant of the boundaries and focus of the firm's business model.

A broadening of the firm's focus would be favoured when the architecture within which it is located is rapidly expanding. The firm should consider whether it would be better off getting a reasonable share of a growing pie, rather than myopically focusing on protecting a large share of a shrinking pie. Thus, a firm may be better off diverting resources to support its platform even though such investment might also benefit its competitors.

The issue here is whether the firm single-handedly, or in collaboration with others, is able to invest in sustaining its own vertical ecosystem, and thus protect it against competing (and often incompatible) alternatives. If the successful support of a platform requires joint investments among a set of collaborating firms, the usual free-riding problem must be solved so as not to undermine the effort.

(iii) How contracting versus integrating can affect your capabilities

Third, innovators should consider if the gains of integrating outweigh the possible loss of capabilities that drive the future innovation process. Quite apart from the cost of moving into complementary assets, a second issue is how that shapes the capability development process; whether broader or more limited scope confers a dynamic advantage both depends on the particular context of a sector and its life-cycle.

Thus, considerations of scope should include an assessment of how that might impact on developing capabilities that support future innovation. Adjusting the scope of the firm both influences its current share of value and its future ability and propensity to innovate.

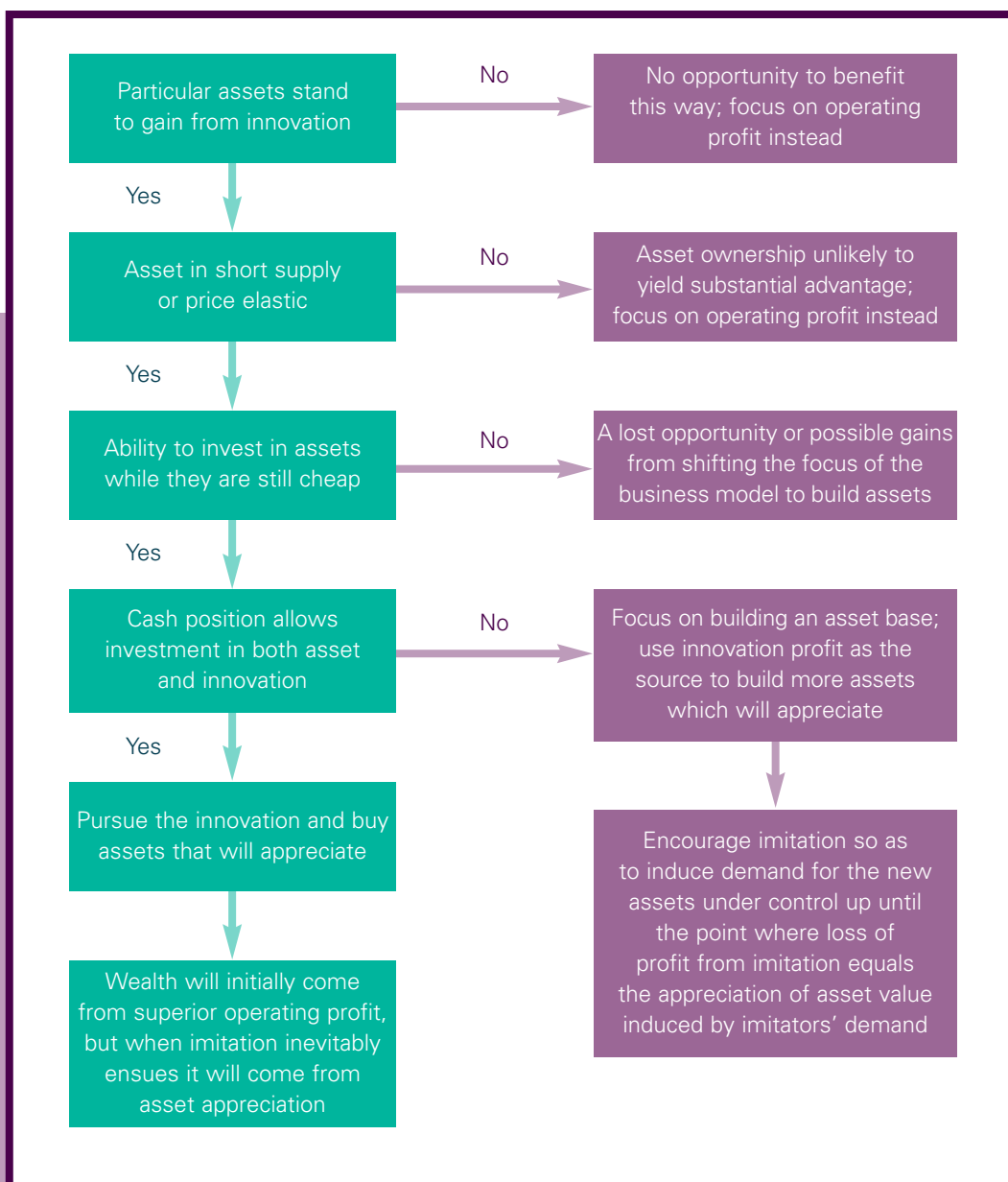
Rather than only caring about how to protect the value of a single golden egg, we might want to think more carefully about not reducing the ability of the goose to lay numerous golden eggs in the future. Accessing complementary assets inevitably changes the scope of a firm and thereby impacts its dynamic capabilities and propensity to innovate. In some cases, such capability adjustment may entail a costly loss of ability to come up with future innovations. Overall, the advantage of integrating should be balanced with the costs of interfering with the firm's ability to innovate in the future.

2 Operating profit versus asset appreciation: A brief guide

Figure 2 considers the fact that firms also have the choice of benefiting from innovation through investing in associated complementary assets.

Firms should invest in such assets when the marginal returns from asset appreciation exceed the marginal returns from supporting a firm's innovation. Figure 2 provides a summary of balancing operating profits secured by control with concerns about wealth creation through appreciating complementary assets.

Figure 2: Profiting from innovation: Wealth creation through appreciating complementary assets



Obviously, the issue of harvesting gains from asset appreciation is only relevant if an innovation influences the value of some of its constituent assets, as in the example of the restaurateur's innovation affecting a neighbourhood's real estate prices.

If it does, firms need to know when it is a good idea to invest in those related assets before the innovation diffuses.

Overall, we should qualify the analysis of possible gains from asset appreciation caused by innovation by considering how the following two critical contingencies give rise to changes in asset value: factor mobility and demand side effects

If factors are immobile, their value would appreciate in proportion to relative gains in productivity. Whether or not it would pay to invest in a specialised, fixed factor prior to the diffusion of innovation depends on the elasticity of demand.

If factors are immobile, their value would appreciate in proportion to relative gains in productivity.

Step one: Only if the elasticity of demand is sufficiently low, is it advantageous to invest in the specialised factor, since this will ensure that the factor will appreciate in value in response to increased demand. This makes the investment worthwhile.

If we know the factor will appreciate in value, once the demand materialises (as opposed to appreciating even in the anticipation of higher demand), then we can turn to the next qualifying condition – the firm's financial resources.

Step two: Only if the firm has sufficient capital is it possible to invest in assets that appreciate after the diffusion of innovation, and only to the extent that the expected returns from asset appreciation exceed the cost of capital.

Step three: The firm should next consider if it has sufficient capital to invest in both the potentially appreciable asset and the related innovation. If capital is scarce, and a choice must be made, the advice is to invest in assets that stand to appreciate first, and then encourage diffusion of the innovation.

The firm should stop investing in the asset when the expected returns from asset appreciation are lower than investing in the innovation itself. Interestingly, the firm may then find it profitable to invite imitation in the underlying innovation, in order to create higher demand for the locked-in asset (and therefore profit from asset appreciation), even though it reduces profitability.

By contrast, if the firm has sufficient capital to invest both in the asset that stands to appreciate and in the innovation, it could harvest operating profits in the early stage of the product lifecycle, when there is no imitation, and then benefit from asset appreciation in later stages of the product life cycle, when competition reduces profits, but increases the asset value.

conclusion: how to profit from innovation – looking ahead

Recent changes in the economic landscape suggest that innovators need to consider new strategic approaches for capturing as much of the value as possible from innovation.

For a start there is significant flux in the nature and boundaries of economic organisation at the moment. Firms are adopting more radical, more open models of innovation, involving increased specialisation and collaboration. Plus there is the shifting of firms' boundaries caused by outsourcing and offshoring.

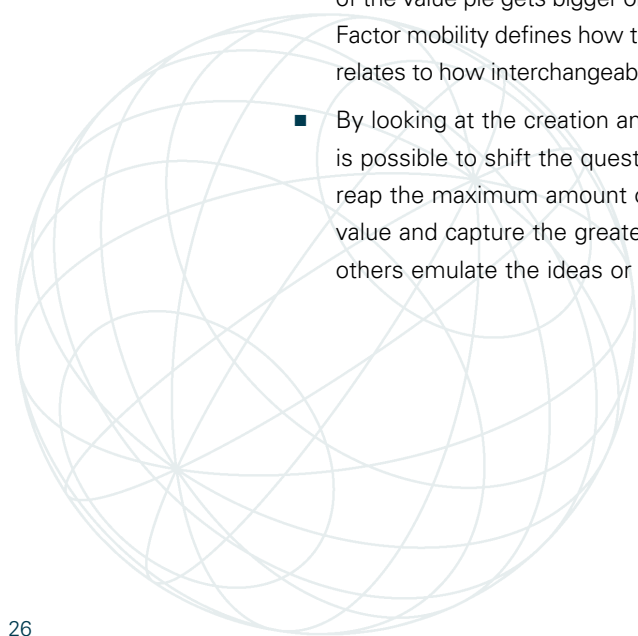
In addition there are a number of titanic struggles within and between technology and industry platforms. In an echo of the Betamax/VHS standards war, for example, tech alliances are staking out the battleground for a DVD standards war with the Blue-Ray camp lined up against the HD DVD supporters. The digital music industry is another battle arena. And there are many more examples.

If innovators do not adapt to changing circumstances then they will risk losing some or all the value created by their innovations. This executive briefing outlines an alternative to the traditional 'protect innovation and if that fails move into that innovation value chain' approach to obtaining value from innovation. In particular it makes a number of important points:

- Firms (and policymakers) must consider the challenge of innovation value capture on a wider scale than the bilateral co-specialised relationships between innovators and other firms that help them capture that value. Instead firms need to look at the industry architecture – the complex network of relationships, the ecosystem, that makes up the economic system they operate in – and consider how they might act in ways that influence and shape that architecture and the boundaries of their activities – 'who does what' – in a way that benefits them.
- To approach capturing or creating value from innovation in this way it is necessary to separate out two distinct components from the concept of co-specialisation – firms coming together in a synergistic way and combining various factors, resources, skills, knowledge etc. to create more value than either would independently.

Complementarity is what defines the amount of value to be divided up. The size of the value pie gets bigger or smaller depending on the fit between the parties. Factor mobility defines how the value pie is divided up among the parties as it relates to how interchangeable any party to the co-specialised relationship is.

- By looking at the creation and capture of value from an innovation this way, it is possible to shift the question from 'how do you protect innovation in order to reap the maximum amount of surplus' to, 'how can you find a way to generate value and capture the greatest possible amount of surplus, regardless of whether others emulate the ideas or not?'



- This leads to an important, novel imperative for innovators. If you can, try to shape the industry architecture you inhabit. Try to become a bottleneck. Similarly, this leads to a substantial new challenge for policymakers. Not only do they have to look at any one segment; but also consider if any firm, or group of firms, have an excessive control of the industry's architecture, using their leverage to dominate or forestall new alternatives coming up. So policies (and strategies) must promote the development of new architectures to compete with the old; they must focus on the evolvability of the system, the ability of new structures to come about.
- Another radical shift of mind may also be called for: Instead of thinking about who gets what slice of the innovation pie in the first instance, think about how to create the maximum amount of value from innovation. It may even be, for example, that there is more value to be had from buying complementary assets that will increase in value when the demand stimulated by the innovation kicks in, than there is from fiercely attempting to protect the innovation from imitation. And, for policymakers, this may mean that their desire to push for strong IPR policies may need to be tempered from a more realistic set of expected benefits from innovation.



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