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Escaping the "S-Curve" – is the "Agile" Organization the Answer?

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Once successful, most companies fall victim to strategic rigidity. The more the business model is attuned to the existing environment, the harder it is to reform it when conditions change. In response to this renewal challenge, the "agile organization" has been hailed as a way to keep innovating and adapting, allowing firms to evolve and grow, making the "S-curve" of maturity obsolete and building strong adaptive capabilities to foster continuous renewal. The purpose of this paper is to better understand the strategic role of agility in the life-cycle of a business. We explain what an agile organization is, the limits of its applicability (boundary conditions), the nature of the output and innovation it produces and the required preconditions to make it effective. This allows us to assess its potential to deal with the inflection point in the maturity curve and rekindle growth.

Keywords: Strategic agility; Business model; Hierarchy; Transformation; Agile Organisations; Innovation

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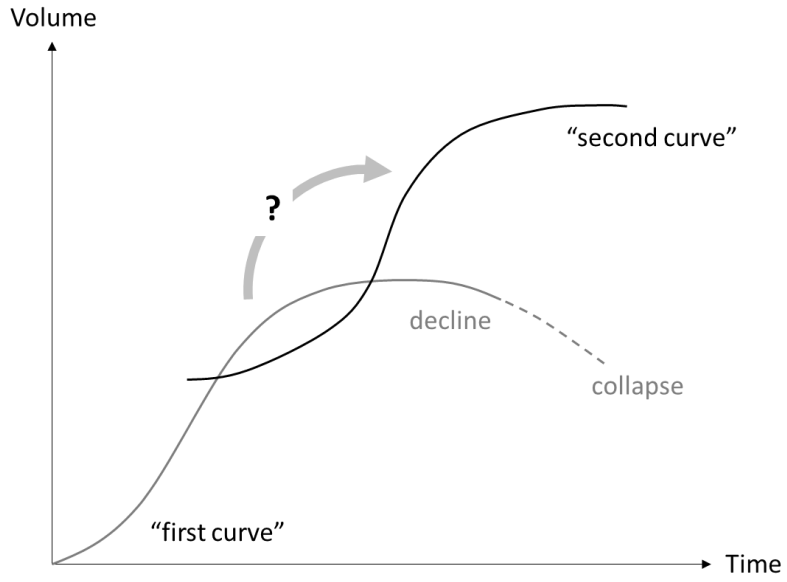
Introduction

Once successful, most companies find it impossible to alter their business model when technological and market circumstances change, and they fall victim to strategic rigidity (Doz & Kosonen, 2008; Doz & Wilson, 2017), active inertia (Sull, 2003) or self-satisfaction (Collins, 2009). Developing not only new capabilities, but also a new mind-set and identity becomes impossible (Altman & Tripsas, 2015). The more the business model is attuned to the existing environment, the harder it is to remake it when conditions change (Siggelkow, 2002; Tripsas & Gavetti, 2000; Aldrich and Ruef, 2006). In fact, management attempts at reform and renewal may well accelerate the company's demise (Hannan & Freeman, 1984).[1]

Figure 1 depicts the challenge as an inflexion point (Burgelman and Grove, 2007) where firms have difficulty shifting from exploiting a slowing growth opportunity to discovering a new one, allowing them to embark on a "second curve" and a new growth cycle.

[1] Exceptions are few. IBM in the 1990s is often cited as one, in particular following the attention the publication of Louis Gerstner's memoirs brought (Gerstner, 2003). But Gerstner framed his approach in a "back-to-our-roots" logic: *"We are again going to do system integration, not on our traditional mainframes as in the 1970s, but now around networks and services".* And it took major graft (30,000 IT consultants from acquiring PwC's consulting business) for IBM to make the turn. The core of IBM was not thoroughly transformed. Netflix is often seen as another example: indeed it shifted from distributing physical products (DVDs) to streaming content online but this was a channel migration not a fundamental business model transformation. Now, Netflix is agile because its on-line business model and digital content allow constant adjustments to its offerings and a form of flexible mass customization, as well as useful customer information to develop its own series, something shipping DVDs back and forth with consumers obviously did not allow to the same extent.

Figure 1: **Few companies get a second wind and migrate to a new growth curve.**



In response to this challenge, the "agile organization" has been hailed as a way to keep innovating and adapting, allowing firms to evolve and grow, making the "S-curve" of maturity obsolete and building strong adaptive capabilities to foster continuous renewal (Aghina et al., 2017; Dennings, 2018). The purpose of this paper is to better understand the strategic role of agility in the life-cycle of a firm. We explain what an agile organization is, the limits of its applicability (boundary conditions), and the nature of the output and innovation it produces. This allows us to assess its potential to deal with the inflection point in the maturity curve.

So what exactly is agility? The *raison d'être* of agile organizations is to bring firms closer to their customers in a way that traditional hierarchy seems increasingly unable to do as firms grow (for a discussion of the pitfalls of traditional hierarchies, see Hamel and Zanini, 2016).[2] Agility allows companies to continuously adapt to changing customer needs. Agile organizational design is a means to that end.

[2] Some of the pitfalls of traditional hierarchies are excessive fragmentation of tasks so that employees do not have a clear line of sight to how they are realizing the firm's purpose of satisfying customers' needs, and therefore are limited in how they can contribute to it; disengagement of employees created by hierarchical decision making, such that the full potential of employees is not haranessed and they are de-motivated and often unhappy; overreliance on documentation and handovers in the hierarchy and a need for endless meetings, hence work is created that is not conducive to creating value and the focus on the client is lost.

Various efforts by firms have emerged in different parts of the economy to shift away from traditional hierarchies to a new organizational model. Whether we are talking about agile in software development units, at Spotify, or "holocracy" at Zappos, or firms that have operated with self-managed teams for a long time such as Favi in France, Morning Star and Valve Corporation in the US, all of them have replaced hierarchy (as a means to make decisions, provide incentives and organize orderly production) with a system of self-managed teams with a clear purpose and decision-making power, focused on customer needs.
For example ING Netherlands, a Dutch retail bank, transformed its headquarters from a functional hierarchy with separate IT, marketing etc. units to a system of multi-functional teams (where IT, marketing and customer journey experts sit side by side), each with 8 to 10 members, a clear purpose/project and end-to-end responsibility, grouped in tribes (e.g., the payment systems tribe with multiple squads each in charge of one particular payment tool, such as a credit card aimed at a particular customer group, such as students starting university studies).

This involves more radical decentralization than the moves made in recent decades towards flatter hierarchies in response to market conditions (e.g., Rajan and Wulf, [2006]; Guadalupe and Wulf, [2010]). It involves empowering the lower levels of the hierarchy, and empowering teams rather than individuals, so that decision making involves more people by design. Real empowerment implies task reallocation within the firm – teams are often multi-functional and have clear line of sight to their customers so that they can deliver goods and services fitting the broad purpose of the company without the intervention of anyone outside the team. That is the core of an agile organization: a system of teams with decision power at the team level. A consequence of this way of organizing is that employee engagement and satisfaction is often greater than in traditional hierarchies, as individuals feel empowered and have a voice.

In what follows, we discuss the origins of agile organizations to better understand the phenomenon, as well as its limits and its potential to innovate. Section II

Managing internally across "silos" detracts from attention to customers; the cost of managing internal interfaces and achieving coordination becomes unbearable as the bureaucracy grows. The rigidity of hierarchies is not conducive to adaptation in an uncertain, increasingly complex and fast- changing environment.

describes the antecedents of agile organizations in management theory and practice, and some of the defining design features. Section III discusses the nature of the work and output inherent to agile, notably the kind of innovation likely to emerge from agile teams. Section IV reviews implementation challenges that appear in an agile transformation. Section V concludes.

II. More than old wine in new bottles?

To understand agility and its potential effects, it is useful to trace back where it came from. A number of distinct developments, occurring more or less in parallel, underpin this organizational form, which emerged from the coalescence of various influences at the end of the last century.

II.I. Historical Antecedents of Agile Organizations

In the late 1950s, Burns and Stalker (1961) distinguished between mechanistic and organic organizations, and in their analysis of the latter identified many features of what we would now associate with agile organizations. In the same period, the Tavistock Institute spawned the "Quality of Work Life" movement and identified features of high employee engagement organizations we would today ascribe to agile (e.g., Davis and Trist, 1974).

Indeed, beyond enhancing customer responsiveness, agile is meant to overcome the tendency for people to disengage from work in hierarchical structures – which are seen as dehumanizing. It empowers employees and gives them direct line of sight over the value of their contribution, boosting motivation, employee retention and commitment to the organization and its success. Agile organizations are more attractive to employees who seek the satisfaction of this kind of structure.
For example, this was a key driver of the transformation at ING, the Dutch bank. The CEO knew the company needed top IT engineering talent but felt that it would not be attracted by a legacy organization where IT developers were perceived as subservient to the "business side". The new organization gave them a more important role that made ING more attractive to software engineers (and other technical occupations). Obviously, personal and career development issues may still emerge in the longer term as the opportunity to contribute to more challenging

projects may no longer meet employees' expectations, and the best among them may then leave.

Studying the management of Swedish multinationals, Gunnar Hedlund coined the term "heterarchy" (Hedlund, 1986) and in so doing hit on a distinctive feature of agility: the elimination of traditional management hierarchy. This is close to what Mintzberg, in his study of the National Film Board of Canada, called "adhocracy" (Mintzberg and McHugh, 1985). These contributions identified the main features of what would later become known as agile organizations.

One manifestation of these models is the "Holacracy" movement (e.g., Robertson, 2015). Firms across a range of industries, driven by a desire to empower employees who had disengaged or felt disempowered by the traditional hierarchy, have replaced it with self-managed teams that eliminate managers, organised around a clear purpose/client need. Other examples include the French brass car parts manufacturer Favi, where teams are created to serve a car manufacturer's orders; Hervé Thermique cooling systems and air-conditioning installations (Hervé, D'irribarne, Bourguignat, 2007); Buurtzorg's self-managed teams of nurses delivering home care (Del Carpio, Guadalupe and Sullivan 2017), and Morningstar, the main tomato processing firm in the USA (Hamel, 2011). Frederic Laloux calls these "Teal organizations" (Laloux 2014).

Another antecedent had its origins in Japan's irruption as a serious global industrial contender in the 1960s, triggering research interest in its original manufacturing management processes (starting with Ron Dore, [1973] and continuing for decades). The small-group continuous improvement processes characteristic of Toyota and other Japanese industrial companies directly inspired many of today's agile organization practices, although clearly did not extend them beyond manufacturing settings and blue-collar production employees.

Fourthly, the influence of matrix organizations is apparent, starting with how companies such as Spotify or ING graphically depict their organizations as a lattice of "tribes" and "chapters" intersecting around "squads", similar to the way project engineering matrix organizations are often represented. The virtues and failings of matrix organizations have long attracted scholarly attention (e.g., Davis and

Lawrence, 1977, 1978; Galbraith, 1973; Egelhoff, 1982; Bartlett and Ghoshal, 1998; Egelhoff and Wolf, 2017) and the agile approach can be seen as a way to avoid the toxic side-effects often associated with matrix organizations. From the "individualized corporation" proposed by Bartlett and Ghoshal (1990, 1998) and their model of entrepreneurial matrix organizations led by customer facing "frontline entrepreneurs" the agile organization is only a small step further, conceptually.

So, to analysts of matrix organizations, agile is less a new form of managing than an evolution of matrix organizations trying to avoid the pitfalls that led to proverbial "matrix paralysis". In considering these pitfalls, we observe a basic difference: Bartlett and Ghoshal, among others, advocated radical decentralization but not the abolition of managerial hierarchy. This left dual or multiple hierarchical reporting lines separate and in potential conflict at the bottom, with the front-line entrepreneurs close to the top with "dual hatted" senior executives. Ample room remained for conflicts to fester and for paralysis and strategic stasis to set in (Doz and Wilson, 2017, chapter 7). In contrast, agile organizations rely on horizontal mutual adjustments between teams when needed, with meetings programmed among them that do away with hierarchical reporting, enable swift conflict resolution, and only allow selective escalation.

Fifth, mainly through consulting practice, the business process re-engineering (BPR) movement also uncovered a need for agile organizations as a next step in transforming organizations. CSC Index, a leading consultancy in the BPR domain, articulated agility principles as enabling initiatives by individuals and teams, in the context of a common understanding of goals, to identify and pursue relevant change and growth opportunities in a tolerant setting where individuals can "fail and grow".

A sixth influence was the challenge of managing large software development projects on schedule and on budget, and the vogue for parallel rather than sequential approaches, often using the metaphor of the rugby scrum rather than the relay race (e.g., Nonaka and Takeuchi, 1996). The "Agile Manifesto" (Beck et al. 2001) defined a philosophy specifically to overcome the limits of traditional hierarchical waterfall software development, later formalized by the 'Scrum'

methodology of software development (e.g., Schwaber and Sutherland, 2011). The goal was to make IT departments more flexible, customer-centric and able to deal with complexity through constant adaptation. The priorities of the Agile Manifesto were: Individuals & interactions over processes and tools; Working product over Comprehensive documentation; Customer collaboration over contract negotiation; Responding to change over following a plan. Several methodologies to implement this philosophy were designed (e.g., Scrum, Kanban, LeSS, etc3) to re-organize the IT department (and potentially the firm) in a system of self-managed teams with a clear purpose and the flexibility to work towards that purpose in the way the team deems appropriate.

Lastly, let's not forget that most organizations are born of small, informal founding teams combining market and technical insights, often dealing iteratively with the discovery and emergence of a new business model, looking for their first customers and co-experimenting with them – in a word, naturally agile. No wonder that agile is natural for new ventures but very rare among incumbents.

The overriding conclusion from the above overview is that agile was simply the logical "next step" for many approaches to organizing, which arose from their convergence. So why did it take so long to emerge?

II.II. Why now?

The convergence was a consequence of many changes. First, a concern for improving customer service and reactiveness to customer needs that is at the core of all agile organizations. The digital revolution made this more urgent, and more feasible. Of course competition comes faster and also finds it easier (via digital channels) to reach customers. ING's efforts, for instance, as for other banks following a similar trajectory, were spurred by "fintech" ventures looming large, making traditional incumbents vulnerable (Doz and De Roover, 2017). Yet for ING's multichannel approach to customers (as for Netflix with digital streaming) the shift to digitalization also enabled a faster and more responsive business

[3] The methods themselves draw heavily from ideas in lean manufacturing, best practices in running teams etc. For example, Scrum calls for daily stand-ups, short sprints leading to prototypes, breaking the problems into user stories with points that get tracked on burn down charts, with a Scrum master removing impediments etc., i.e. a methodology to run the team in the most effective way.

model to take root. The digital revolution means that software development – the cradle of agile organizations – becomes much more critical to a vast range of innovation around the Internet of Things.

The growing complexity many companies face in their strategic choices, where both speed and interdependency pose challenges, puts an increasingly large premium on agility (Doz and Kosonen, 2008). In their seminal work, Doz and Kosonen – considering how ICT companies handle complexity and disruption – identified resource fluidity as one of three key enablers of strategic agility (the other two being strategic sensitivity and leadership unity). Limited resource fluidity (i.e., the ability to re-allocate resources, be they human, technical, or financial, as new opportunities and threats arise in a fast and flexible manner) is a major stumbling block for most companies; no matter how strategically aware and smart their choices are, they cannot execute.

Organizational agility, as considered here, is an enabler of resource fluidity and thus a major contributor to strategic agility.[4] Moreover, increasing complexity renders traditional forecasting and planning strategy-making ineffective. There simply are too many uncertainties creating too many surprises. Rather than planning handling uncertainties requires fast experimentation and flexible probing. Then the action implications from learning through experiments allow management to implement adaptive change rapidly. Through such fast experimentation and adaptation an agile organization is therefore better equipped to handle complexity than a hierarchy.

A third major driver has its source in evolving workforce demographics and expectations. For many millennials, a sense of purpose in one's job is more important than for previous generations, and the idea of spending the whole of one's professional life at one firm has less appeal. Hence organizations need to provide a workplace environment that reflects these changing expectations.

II.III. Forms of Agile

[4] Of course, autonomous teams close to customers also provide the opportunity for sensing market knowledge and contribute to strategic sensitivity, but this also depends on integrated sense-making capabilities across teams, a process that agile organizations may not encourage.

We have defined agile as a way of organizing based around autonomous teams that are fully empowered to make decisions. In practice, there are several forms of agile. While all share that core concept, they can differ in implementation. Once the fundamental design choice is made, a number of features naturally emerge (from the complementarity between design features),[5] as follows.

- The choice implies that setting up teams and assigning each of them end-to-end responsibility works better because they have a full view of customer needs and can respond because they are unencumbered by interdependencies. (Although some firms implement agility only around software development in the IT department, others do it --like ING-- in the whole organization with an end-to-end discipline).
- Although a rapid iterating/prototyping 'lean innovation' approach that relies on design thinking and Scrum methodology is feasible in a hierarchy, the agile approach is more effective because it will typically allow for faster cycles. Ideas that would need to wait for lengthy development and approval cycles to be tested (sometimes only to find out that customers do not want them) can be developed and submitted to in-market tests early.
- In agile organizations, the traditional manager's role of coordination, performance evaluation and decision-making disappears, as these tasks are spread between different individuals such as agile coaches, tribe leads and chapter leads. This may result in significant headcount reduction among middle managers.[6]
- The culture needs to change from one of compliance to one of participation, so that everyone is heard. Agile organizations create routines and support mechanisms for personal engagement and train people in the new culture (e.g., via "agile coaches" who help teams

[5] Some observers and researchers list some of these features as "defining" agile, but they can more usefully be seen as arising naturally from the choice to deliver value to clients through a system of empowered self-managed teams. None of these features is truly essential but they make the agile system of teams work better. What precise shape they take in an agile organization or another will depend on the environment, the product, how much management is willing to give up decision-making authority, the ability of the firm the change, or its culture. So different "styles" of agile will emerge depending on how these choices are materialized at each firm.

[6] An agile organization, by eliminating management layers, reduces headcount (30% to 40% at ING Netherlands for example), saving labour costs.

develop and implement informal rules of participation and facilitate meetings).

- To fully tap the power of the team, practices are put in place to make the firm a "safe space" where employees can be themselves and reach their full potential and creativity. This is the "wholeness" Laloux describes (Laloux, 2014). "Holacracy", an agile approach implemented by Robertson in his software development firm, also has a full set of practices to ensure collective commitment (Robertson, 2015).
- Hierarchical coordination is replaced by rules or practices for effective joint team decision making for activities that involve or/and impact multiple teams (dubbed the "advice process" in many firms, whereby each team has a moral obligation to inform and seek advice from other teams for decisions that impact them, in a way that encourages teams to regulate interdependencies constructively).
- Adopting agile organization principles also has implications for optimal team formation and stability. To elicit true commitment, in many agile organizations employees "vote with their feet" – by joining teams.[7] Stable teams tend to be regarded as better as members can learn to work together and use the team experience.
- To be able to deliver, teams need to be multifunctional. The individual members bring specialist skills but need to be open to working with people with very different backgrounds –this has implications for who to hire and what training to provide.
- Senior leadership has to let go. As top-down steering gives way to bottom-up initiatives, the role of top management may be reduced to culling some initiatives, supporting others, and deploying pilot teams' results when they apply more widely. To use a simple metaphor top management becomes an English rather than French gardener: Not selecting each and very plant ex-ante and planting precisely where it

[7] Both practices vary across firms, e.g., an IT firm may change team compositions and assignments frequently to make sure that the code they write is clear and well documented enough to be built upon by anybody else; approaches to assigning people to teams may also vary from entirely self-driven with ideas that elicit people's commitment and desire to work on them becoming teams, to more regulated assignments where "chapter" (akin to an internal community of practice) leaders play a key role in assigning specialists to one team or another.

fits, but taking weeds out and helping budding flowers bloom. The logic of strategy making shifts away from traditional planning and implementing to a more evolutionary, adaptive approach, including the possibility of evolutionary purpose (March, 1994).

- Incentivizing relies more on the intrinsic motivation that comes from the team's autonomy and purpose rather than extrinsic rewards such as compensation or promotion.

The combination of practices put in place by different firms will (and should) depend on the context, the product, and firm idiosyncrasies (e.g., the willingness of leadership to "let go", the extent of coordination needs, the firm's culture, its belonging to a national culture where different agile practices may be germane or not, and of course the skills it has available). There is no single form of agile, but a continuum of possible design choices and tweaks adapted to the context.

Despite its widening scope of application, however, agile is no panacea – contrary to what its apostles would have us believe. In the next sections we discuss how applicable and sustainable agile is, analysing whether it requires specific enabling conditions.

III. Boundary conditions of the agile organization

The agile school of thought (and practice) predicts that when an organization's activities can be reorganized around empowered self-managed teams, the consequences will be improved performance, outcomes and innovation. But is this always possible? In this section we investigate what needs to be true in the nature of the work so that it can be reorganized following agile principles, and the type of output that emerges, particularly the type of innovation. Considering the nature of the work and expected output enables us to outline the boundary conditions to the application of agile, from the broadest level (e.g., type of industry or service) to more specific considerations such whether agile practices can spread beyond the IT department of firms to encompass the whole organization.

III.I. The Nature of the Work: Modular, sequential, "end-to-end"?

The agile approach is, at its best when the firm's output can be decomposed into modular, sequential tasks so that teams can be end-to-end, i.e. be fully responsible and able to deliver a product Buurtzorg, the Dutch nursing home care organization meets all these conditions. It created teams in a natural way (by geographical areas) with few interdependencies. In addition, each patient is taken care of by one or at most two nurses, and nurses coordinate patient care at the area level.[8]

For more complex products, where interdependencies between teams are large, agile organization typically set up some form of "teams of teams" (or "teams within teams") with some scope for hierarchy. For ING payment systems, for example, an intermediate level coordination role (the Central Product Owner, CPO) was added because the payment systems "tribe" was quite large and the development of various payment instruments and prioritization between them required coordination between teams, each working on a particular instrument.[9]

The level of task decomposability/modularity is seldom a once-and-for-all given. Often it is a choice on the part of management as a function of industry conditions and it can change over time. So what happens when systemic decomposability decreases as a product is being improved? Tesla, for instance, has been used as an innovative example of product decomposability, with an agile approach inspired by Toyota (Rigby, Sutherland and Noble, 2018). Other automotive firms may make different choices. Some tier-one suppliers to the auto industry, would argue that cars become less decomposable into sub-systems as they are further improved, hence to achieve systemic improvement the architecture must be integrated (e.g., having to cool the headlights to allow the light sources to be brighter, smaller, and their optics and fairings more aerodynamic means that engine cooling is no longer a separate sub-system as some cooling airflow goes to the headlights, and the front-end architecture becomes more integrated). Wider systemic challenges to modularity, such as pedestrian safety, call for less

[8] This organization around autonomous geographical teams contrasts with thee typical organizational in that industry where nurses specialize in a skill and one patient can see several nurses even in on day.

[9] In general, integrating the work of teams at multiple levels when challenges and opportunities (as well as tasks) cannot easily be decomposed leads to excessively large tribes. Scaling up is feasible, but only when task decomposition is preserved, although both decomposition and integration may be multi-layered, as with payment systems at ING

decomposable systemic approaches to product development, making it less amenable to agile organizing (Mc. Duffie, 2013; Mc. Duffie, Jacobides and Tae, 2016). Faced with many systemic interdependencies, the lateral advice process becomes less effective: not all interdependencies may be identified by teams ex-ante, reconciliation may be slow and time-consuming, conflicts may erupt around priority-setting in design and resource allocation. (For a detailed discussion of an example, GitHub, see Burton, Hakonsson, Nickerson, Puranam, Workiewicz and Zenger, 2017).

In such conditions, lateral coordination becomes overburdened and may get bogged down. Reintroducing management roles, at least for coordination and priority-setting, may be needed but may undermine the spirit of agility. System integration "teams of teams" may complement task teams (as the clusters of teams coordinated by a CPO in ING's payment services teams [see Del Carpio, Brandwein, Doz and Guadalupe, 2018, part 4).

Many companies with strong interdependencies across products and channels, yet wanting to stay agile – such as Lego – have resorted to integration mechanisms such as "dependency boards" for mapping interdependencies and "big room planning" processes and various forms of "stand-up meetings" for resolving them.[10] It nonetheless remains that the more integral the task, the less effective and the more unwieldy an agile approach becomes.

Another key element is that the "end-to-end" logic of task assignments is feasible; but this is not always clear. Think of toys: who is the downstream "end"? Kids at play, or parents and other adults purchasing toys? Or toy stores and on-line distributors? Co-branding with video games or content providers such as Disney, for example, also means providers of complements – with whom Lego is co-dependent in a common ecosystem – need to be taken into account. Furthermore, its convergence with digital entertainment means that its products are sold with, and often via, ecosystem partners – to what extent can agile teams include them? Lego has developed a host of ways to remain in touch with kids through the digital

[10] For details on Lego, see communication by Elk Thyrsted Brandsgard, at Agile Summit Greece, 2017

revolution, thereby protecting and strengthening the brand franchise (Hienerth, Lettl & Keinz, 2014; El Sawy et al., 2016; Ringen, 2015).

This cannot be done at the level of separate teams – even sprinkled with "customer journey" experts – and end-to-end responsibility may only apply to part of the total value-creation process. The process is therefore broken into stages, as at Unilever (R&D, supply chain, marketing, sales), or at least distinct "front end" and "back end" components. Process disaggregation and internal markets may thus recreate "end-to-end" accountability.

Day-to-day operations, while amenable to decentralized and self-managed team approaches, may not benefit from them unless localized practical innovations of generalizable value emerge from operations. Put differently, agile works better and is more valuable for development efforts than for routine day-to-day operations. ING, for example, has extended the agile approach to functions like HR and Finance to facilitate their interface with product and application development; while it has also been implemented by branches in the field, its perceived value there was more limited. In fact, it was the digitization of ING's core customer relations (what it calls its "omni-channel approach") that enabled the wider adoption of agile methods as the shift to internet-based customer service allowed for a faster, more fluid diffusion of product and process innovations.

Another critical facilitator of agility is having a rich enough set of opportunities to pursue, combined with the requisite availability of talent. ING, for instance, enjoys wide-ranging online digital banking application development opportunities, but if these were not balanced with talent availability the agile approach would be less effective. Too few opportunities and yield declines (too many agile teams chasing too few real opportunities creates a risk of 'spinning wheels'); too many, and talent is stretched too thin, or competition for talent between teams becomes excessive (Ketkar & Workiewicz, 2017). When the opportunity set has been largely exhausted, an agile organization may breed frustration and conflict rather than success. For instance, W.L.Gore, re-established a corporate strategy group in 2015 and recentralized strategy-making as the market for its membranes matured and it found it increasingly difficult to uncover new opportunities for their use.

Others achieve agility by accelerating new application development and exiting from application domains as they mature with a deft use of strategic partners. Partners bring markets, fast access, and manufacturing capacity, and the agile company brings core technologies and application development skills, allowing them to seize opportunities together. Several companies have followed this logic of alliance-based agility with great success, Corning Glass and STMicroelectronics being two prominent examples (Doz, Santos and Williamson, 2001). STMicroelectronics, for instance, developed a core competence in mixed-signal semiconductors (transforming analogue signals into digital ones) it applied in quick succession to many fields, such as printer cartridges with Hewlett Packard, miniature disk drives with Seagate, mobile phones with Nokia, fuel injection systems with Bosch and many others, with great agility. From Pyrex tableware in a joint venture with Vitro (a Mexican company) to TV tubes with regional partners around the world of flat screen display glass with Japanese and Korean companies and now "Gorilla" glass for mobile phones with Samsung and others, Corning leveraged its core speciality glass competence across a range of application, entering fast and early with partners, and disengaging when the business matured and its technology became less distinctive.

In sum, agile approaches are common where work is modular in nature or can be made modular, where modules are small enough for individual teams and efforts are of limited duration, and where opportunities abound for new products and new ways to service customers (such as in software development) that have made limited inroads elsewhere. In this context, standalone teams can be created that are accountable for end-to-end results and thus improve customer service, their work, and individual commitment. More generally, making production modular often requires a radical rethinking of the product, which may not always be optimal or even feasible.

III.II Outcome of the work: Adaptation or Innovation?

Agile is often seen as a way to propel a leap forward through increased innovation. But what if it actually made innovation less feasible? In principle, when properly skilled and resourced, autonomous cross-functional teams should be innovative and creative, particularly when customers (and more interestingly, non-customers) are central to their preoccupations. But in practice, its contribution to

innovation is questionable. Will small teams be willing to truly explore new ground and imagine new products, solutions, market approaches and business models? Or will they settle for incremental innovations along predictable technological trajectories, closer to the constant improvement logic of lean manufacturing? Teams may naturally focus on small, fast (and easy) work, where they can deliver[11] and feel successful.

When teams remain together through sequences of "sprints" they are likely to become more efficient but their creativity may decline. Team continuity has obvious advantages but may erode innovativeness. Will team composition become too stable as team members learn to work together, rely on each other, and enjoy it? Should membership be made to evolve to balance the value of continuity and experience against the need for fresh perspectives and the advantage of cognitive diversity?

Irrespective of duration, will teams take enough risks? There are no formal screens, stage gates, etc., or sanctions (projects that do not attract enough team members or sustain their commitment quietly wither and die), but someone associated with repeated "failure" (and even with misunderstood experiments) may turn into a loser, even a pariah. Can the value of experiments where you never fail as you always learn something (providing they are well designed and grounded) be retained if they have no material outcome? These are tough questions that members of agile organizations keep asking, and rightly so.

To answer them, let's consider some examples. A number of innovative companies have long embraced the agile approach, such as W.L.Gore and 3M, but they do not rely on it when developing new science-based technology platforms. Both firms take a similar strategic approach to value creation: they successfully leverage core technologies (one only at Gore – Teflon membranes, and about thirty five "technology platforms" at 3M) for a variety of separate markets and

[11] Teams can still call upon other teams for specific work, provided they can define work packages that have some modular character (in that sense some squads have internal customers). Can modules be tested separately? "Scaffolding" works for software design, it may not work for physical products so easily [Schneider plant controllers' vibration problems, see case draft.].

distinct applications and customer groups. The agile teams in these firms (used by a large number of business units) identify and develop new applications where being close to customers is a must, but do not develop 3M's core technology platforms (3M has central research labs to do this and previous attempts at delegating to business units were not a success). The logic in both cases can be dubbed 'divergent application-specific development'. In essence, autonomous teams working in close collaboration with customers in a very decentralized independent fashion can work well once the technologies they rely on to develop customer applications exist, but radical innovation does not come from agile teams.

While few companies have so many separate and non-interdependent markets and customer groups, the challenge to becoming agile is more difficult for companies selling a range of related products to the same customers. Haier, the Chinese white goods manufacturer (and now also US- and Europe-based following its acquisitions of GE Appliances and Candy in Italy) is such a company. Founder and CEO Ruimin Zhang, in his desire to see "everyone become an entrepreneur", split the company into a series of "micro-enterprises", each autonomous according to agile principles. These Micro-Business Units (MBUs) either focus on specific product lines or marketing/sales support in a region. A smaller number provide specialized services in finance, tax, intellectual property, real estate, etc. After 2009, Haier became a collection of over 2,000 teams. Contrary to the agile principle of self-structuring teams, some hierarchy still exists, with team leaders selected and appointed by senior management, each team fitting into a hierarchy of leaders from higher echelons who report to group executives (Meyer, Lu, Peng and Tsui, 2016). Manufacturing takes place either in small factories specific to one or a few MBUs devoted to the manufacturing function, or is subcontracted to a third party, while the marketing and sales local MBU secure integration between product lines sold to the same customers (Hamel and Zanini, 2018). Although reliance on internal markets limits tension, typical matrix conflicts resurface as neither product nor commercial MBUs are "end-to-end". So although Haier has borrowed some principles of agile, it faces different problems from W.L.Gore or 3M: it sells nearly all of its product range to the same consumers, largely through independent retailers. It has de-facto put in place more of a "front-end-back-end" organization (with the back end organized partly as an entrepreneurial matrix,

partly as an agile MBU portfolio, and the front end as local marketing and distribution MBUs). Manufacturing and distribution and branding interdependencies make agile considerably more difficult for companies such as Haier to embrace than for companies such as WL Gore or 3M, where downstream interdependencies are few.

Compared to most appliance makers in China and the West (with the exception of Korea and the UK - in particular Samsung and Dyson), Haier has innovated. But it often resorts to open innovation, joint ventures and acquisitions to access new technologies and develop leading-edge products (for instance, a joint venture with Liebherr to make dishwashers and the acquisition of GE Appliances and of Candy (an Italian white goods maker) in Europe.

In general terms, an agile organization seems better suited as a vehicle for customer-intimate incremental innovations along a known technological trajectory than as a vehicle for pursuing major innovation. Agility brings engineers into close collaboration with marketers and thus breaks down silos between technologists and market experts. For example, it has been highly effective at ING for small, customer-driven innovations. Yet ING has still found it necessary to set its most innovative new businesses as separate entities. Yolt, for instance, is an independent company, funded by ING to develop a platform that allows all the bank accounts of a customer to be aggregated into one with different sub-account categories. ING has also created an incubator/accelerator for innovative initiatives such as new software testing methods or new transaction platforms. These new product ideas cannot be developed at the core because, according to Yolt's CEO, that would impose strong constraints on innovation. Chief amongst these are having to rely on common legacy IT systems that do not allow the flexibility needed by the new products, limits to using non-proprietary cloud networks and infrastructure, reticence to collaborating with partners, in particular Fintech ventures, and also a conservative risk-averse culture that needs to maintain the stability at the core of the business and protect the brand identity. The difficulty in itself is not stemming from agile management principles but from the context of a large incumbent bank. Yolt itself is organized according to agile principles with nine squads, but is outside the core of ING, and remains a small entrepreneurial entity.

Overall, while agile organizations in incumbent firms deliver incremental innovations in a natural way, these firms have a hard time developing and delivering radical innovations. Really new businesses and technologies may best be incubated outside the core. Organizing along agile principles further biases the innovation process toward exceedingly fast but incremental innovations that fit within the existing strategic and organizational contexts, with the attendant risks of built-in conservatism, premature cannibalization, product overlaps and duplication and neglect of product life-cycle management (service, documentation, quality-in-use). This might be regarded as a semantic distinction, but clarity about what firms seek is important: better delivery of incremental innovations is the very *raison d'être* of the agile organization, but this should not be confounded with radically new innovations that have a hard time living in the core and that agile organizations may not encourage their members to pursue and deliver anyway.

However, there may be more potential for agile approaches to contribute to innovation than the above examples suggest. In particular, the digital revolution makes early and fast prototyping more feasible. Digital simulations lower the barriers to the agile approach that an uneven commitment to innovation creates. For example, a real jet engine cannot be fully tested until a complete prototype is built and assembled and put on a test plane but a virtual "digital twin" can.[12] While it may not eliminate all process engineering and manufacturing ramp-up problems, as seen in the actual introduction of new jet engine types, it can provide proof of concept early. The process of design thinking may help decompose the risks into manageable steps over time, but the organization must decide which projects are failures without waiting for real customer reactions to "in-market tests". "Scaffolding", a practice first introduced in the IT industry, simulating other modules with crude prototypes also allows module testing without having to have developed the whole product. This again may drive them toward small, low-risk, incremental projects ("bells and whistles" on something already in use, not a real innovation). Companies faced with big innovative projects separate technology

[12] As an illustration, GE Aviation now designs and develops its new jet engines in a digital simulation environment in Bangalore, India.

development from technology exploitation, a risk reducing choice usually made, for instance, by plane makers[13].

Of course, one may still be wrong strategically or ahead of one's time – think Airbus A380 vs. Boeing 777 and Airbus' bet on early airport saturation. Yes, it will come, but not in sync with the A380's availability, leaving Airbus with sales significantly lower than expected and, were it not for strong sales of smaller jets, in a potentially precarious financial position.)

In addition, agile, by bringing teams closer to the customer, may trigger ideas that then can be taken outside the core agile organization. For example, the prevention programme "Buurtzorg plus" and its youth centers were ideas that emerged from nurses working in the field in agile teams, that were then experimented on, tested and, if successful, scaled up.

In some industries, agility may help at some stages in the innovation process but not in others. For new pharmaceutical molecules, for example, it would help in drug discovery (identifying natural or designing new molecules as drug leads), but later on, drug development has very long lead times for safety and efficacy trials, with very high uncertainty and heavy regulation – which are not as amenable to an agile approach. Furthermore, in some ecosystems, intrinsic differences in the consistency and timing of commitments between complementary goods become difficult to handle. For instance the complementarity between semiconductors (where a new product takes years to develop and is made through an exacting precision manufacturing process that can be modified only with a plant refurbishment every few years, and comprises about two thousand steps to be performed to perfection in a set sequence), and software amenable to an agile approach became a source of tension between Intel and Microsoft in successive generations of personal computers (Casadesus-Masanell and Yoffie, 2007). In sum, in many circumstances "agile innovation" may well be an oxymoron.

[13] That they sometimes violate at their own risk, for instance when Boeing on it B787 Dreamliner pioneered the use of composite materials for nearly the whole structure and farmed out responsibility for large modules to a variety of partners, but found integrating their various contributions difficult (Doz & Wilson, 2011)

IV. Perils of implementation:

We now turn to the set of limits to the application of agile (another form of boundary condition) that may not make its adoption less desirable in principle, but undermine the likelihood of firms staying the course. Like any major organizational transformation, adopting an agile approach and embedding it in an organization is a long journey that often takes several years, as opposed to instant reorganization. Its transformational nature implies some basic boundary conditions. In particular, top management commitment, middle management resistance, and cultural compatibility may be major barriers. Obviously, these are challenges of any organizational transformation or change management process, but they take a particular form when implementing an agile way of working, as discussed below.

Top management true commitment:

In the crudest sense, an agile organization does away with management except at the top, and distributes managerial tasks among a large number of specialist contributors. The remaining top management needs to "let go" – empower the teams and let the system function and the teams do their work. As a result, their job also changes. This requires a level of commitment to support and defend the new agile system without which the transformation at best can be only partial, and at worst a complete failure.

ING's top management was fully committed to the transformation. This included the CEO as well as the COO, under whose mandate the merger of the business and IT teams into "end-to-end" agile squads took place. They expressed their commitment in their day-to-day behaviour and communication but also signalled it in smaller but meaningful ways. For example, by giving up their corner offices and hot-desking along with the other teams, which for a traditional status-and-hierarchy-driven culture like banking was a significant move.

Middle management transformation:

In several of the organizations that have moved to agile, the middle management of the past is now referred to disparagingly as "permafrost". Yet in a traditional hierarchy, for ambitious aspiring executives climbing the middle management ladder and having more decision power and status is often a main goal. In agile organizations, the roles of middle managers (decision making, performance evaluation, mentoring and coordination) are distributed between tribe leads, chapter leads, product owners, agile coaches, specialized support staff, and team members themselves etc. For those who aspire to "climbing the career ladder", the agile organization is not the right place.

In an agile organization, career progression is less about having more decision power and more about developing skills. Everyone needs to have specialized skills that they use day to day, the value of which is recognized by peers. Complementarity of skills among team members is essential as the value of individual members is unleashed only through the team. Hence individual and team performance are interdependent, making individual evaluation difficult and moves between teams risky –members may ask themselves whether they would perform well in another team.

Ironically, as middle management disappears and specialized skills gain in importance and are expected from all employees, so are skills that traditionally associated with good management. This is because high-performing teams require members to have strong interpersonal and leadership skills. It is difficult for hierarchical traits not to 'creep back' into the teams, either via former managers or emerging team leaders.

Largely thanks to a peculiarity of Dutch labour law, ING had the advantage of being able to lay-off and rehire the entire workforce of the core banking business in the Netherlands prior to the transformation. Everyone was put on "mobility" and had to apply for a new position. Recruiting teams were created and people were screened as much for their technical skills as for their interpersonal skills and ability to work in the new system. As a result, many people that did not fit with the new organization decided to leave (including a number of middle managers, and some specialists with excellent technical skills).

Of course, rehiring is not always feasible; neither is managing organizational commitment through this type of change an easy task. Bart Schlatmann, ex-ING COO, went on to work on a transformation toward an agile organization at Sberbank, the giant Russian bank. There, it was not possible to rehire everybody, but he realized that what was essential was to appoint the right people to the tribe lead roles, and in key senior positions. The right tribe leads would steer the organization to the new paradigm, while peer pressure ensured people would adapt or self-select.

Fear of the unknown: balancing guidance and autonomy

Employees steeped in a "vision" perspective, where strategy is set for them, may find the agile approach (and the freedom that goes with it) disconcerting, and yearn for guidance. Others may run in all directions, with a risk that the company's actions will be fragmented. Balancing strategic guidance (with a risk of it being seen as hierarchical pressure) and autonomous initiatives and action is obviously delicate. When adopting agile principles, a hierarchy of priorities may be created in some form of participative strategic architecture exercise, and be set as a portfolio of opportunities for team creation. This provides ex-ante consistency. This "pick from the portfolio" approach may work for process improvement but throttle the innovativeness of teams and stifle their commitment (if perceived as choosing from a catalogue rather than pursuing their own ideas and passion). Later, on an on-going basis, managing "boundary control" from the top – i.e., specifying areas/businesses *not* to pursue --and articulating criteria for what to pursue may combine coherence and freedom (Simons, 1994, ch. 3). But even within defined boundaries, complex strategic integration (Burgelman & Doz, 2001) and the articulation of strategic context and boundaries can be difficult when the consequences of innovations are uncertain and ambiguous (think large-scale 3D printing or blockchain ledgers). The greater the complexity a firm faces, the more ex-ante strategic integration becomes genuinely impossible, and the more boundaries emerge and can be drawn only ex-post. So the issue becomes more difficult over time: seemingly "small" commitments today may turn strategic later questioning subsidiarity and leading to "creeping commitments" and path-dependency.

Evolution/preparation of Organizational Culture:

Becoming agile is an evolutionary process. The evolution of an agile culture is the most important condition to make it succeed. To support a system of empowered teams, a culture conducive to high-performing teams must be created which is collaborative, transparent and flexible.

At ING, the transformation was supported by what they called the Orange Code, which was created in a bottom-up fashion by gathering input from the organization, and spelled out three key behaviours that characterized ING as a digital innovator: "Take it on and make it happen. Help others to be successful. Always be a step ahead". In 2015, employees were canvassed to identify the values considered most relevant to achieving the agile transformation: they identified collaboration, courage, responsibility, trust and challenge.

Bart Schlatmann commented on the agile culture at ING:

"*Agile is not for everyone. If you do not fit in that culture, it's very hard to be engaged and be successful. With Agile it's important that people in all the squads collaborate closely within their squad (team) and with other squads. There is no room for egos; therefore culture (our Orange Code) became a very important part of the selection process and the continuous improvement of teams"* (del Carpio, Doz and Guadalupe, 2018).

Indeed, at ING one of the biggest predictors of team success was how strongly they adhered to the behaviours of the Orange Code. It had an enormous predictive power for employee engagement, efficiency, and time to market.

Context of National cultures:

National cultures also play a role. Some are more receptive and congenial toward agile than others. Every culture will "contextualize" features of an agile culture, creating a danger of fragmentation, as for instance SAP discovered in "moving" an agile approach from Silicon Valley, where it was developed, to other development centres around the world. To cite one simple example, when it came to co-development with customers, its Indian engineers responded: "What else is new? We have been doing this for many years, no fuss!" ; while Chinese staff said

"This is absolutely impossible! It would be seen by our customers as an admission that we do not know what we are doing, and we would lose face."

V. Conclusion

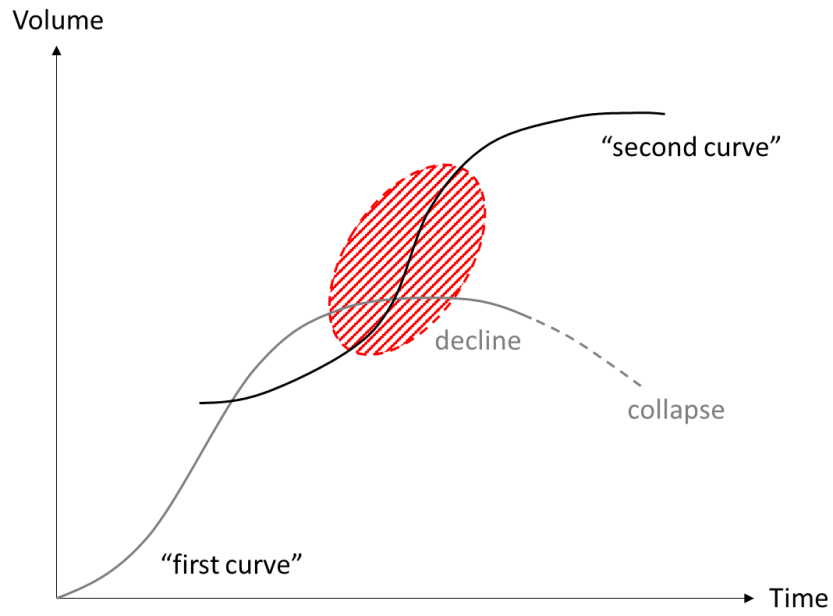
Observing the current vogue for agile organizations, we began with the question: Could adopting an agile form of organization allow incumbent companies, facing slow down and decline, to discover and exploit a new growth trajectory, popularly referred to as a "second curve"? as illustrated in Figure 1.

Our answer is somewhat nuanced. First, in our analysis we identified boundary conditions, for instance around the modularity of key tasks. Second, and most importantly, we showed that expecting an agile organizing approach to yield major innovations that will launch a new growth spur was unlikely; contributing to incremental innovation and adjacent business development is where the agile organization is most effective. Developing new application domains, be it for Teflon membranes, adhesives or financial services online platforms, is where agile organizations are at their best: a stream of small innovations over time (though some may serendipitously become big, like Post-It notes or GoreTex garments). Put differently, an agile organization is unlikely to discover a major new growth curve but can exploit and extend an existing one to many customer-driven application domains.

For an existing growth curve, as growth slows towards maturity, an agile organization may remain valuable as a way of pursuing incremental innovations and improvements, perhaps more on process rather than on market dimensions. Agility also helps maintain a high level of employee commitment, even in rather mature businesses such as tomato processing, as exemplified by Morning Star. Its purpose, however, needs to be clearly redefined, lest employees keep trying to find new innovative applications, only to become increasingly frustrated by their growing rarity.

The shaded area in Figure 2, below, shows where adopting an agile organization – for a mature incumbent such as ING – offers the best pay-off. Companies may shed agile organizations as they mature and the growth curve flattens out.

Figure 2: Where Agile organizations are most likely to contribute (shaded area):



In sum, agile organizations – despite all the hype around them – offer no universal panacea. Beyond their use in software development, agile teams can serve a clear strategic purpose at certain stages in the evolution of a company's business, provided certain conditions - the nature of a firm's activities and the adaptability of its culture – are met. In the absence of these, they may still give an enduring boost to employee commitment, but the strategic logic for choosing this organizational form would then be very different.

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