

9 Agility, Innovation, Technological Disruption: How to Better Deal With Uncertainty

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Introduction

Technology today is fueling major transformations across industries, companies, and individuals alike. It is the backbone of the digital economy, with unprecedented changes that are exponential in scope and the extent to which they are potentially disrupting existing businesses. Frequent new product and category innovations define and redefine the sector's constantly shifting landscape. But changes are not only affecting the tech-sector itself, they are also diffusing through other industries resulting in convergence and newly created ecosystems. New technologies are influencing the way industries use energy, redefine mobility, or revolutionize payment solutions.

Many companies are realizing that standing still is not an option. Market entry barriers are shrinking and new entrants, often young and small companies, bring disruptive trends to the market and transform vertically integrated value chains. While the aspiring players usually lack the financial stamina of their larger counterparts, they benefit from higher flexibility, lower institutional constraints, and new ideas for collaborating across industry boundaries. Opportunities that result from the integration of technologies are creating a flurry of innovations that are likely to impact revenue growth. Faced with the challenges in building or maintaining innovation and market leadership, technology companies are pursuing a variety of initiatives to position themselves for the coming years. For instance, they are changing their business models, and implementing transformation initiatives to improve their ability to meet customer needs, technical innovation and organizational agility. In addition, tech executives are required to continuously act as strategic catalysts by identifying business opportunities and change models, and by embedding them in the organization.¹

Talking to Edward Krubasik, a long-time expert in technology-based industries, reveals in-depth insights into today's challenges. He describes, among others, how innovations emerge "in between" original technological fields, how large companies can be agile through the decoupling of old structures and new business units, and why threats always imply opportunities. Edward

Krubasik helped many industrial companies in the high-tech sector in projects with McKinsey & Company, in the USA and in Europe. As Principal and Director, he built the practice for Innovation and Technology Management in Germany and in Europe, and later served as the global leader of this practice and of the European Electronics and Aerospace sector. After 23 years with McKinsey, he became a member of Siemens' Central Executive Board at the end of 1996 – in 25 years the first external nomination to the top leadership team of this global technology concern. He was assigned the responsibility for Corporate Technology and the industrial and mobility sector: Automation and Drives, Transportation Systems, Siemens Dematic AG, Siemens Building Technologies AG, Transportation Systems and Siemens VDO Automotive Electronics Group. He served on boards as chairman and regular board member in several European countries, the USA, and Japan, always as a driver of performance and innovation.

Interview

PRANGE: Thank you for your time to talk about agility and the challenges companies are facing today. I would very much like to tap your knowledge on the technology industry in particular. So maybe we can start by recounting your experiences, what you consider as the most important challenges that have occurred over the last few years for the companies you've been working for, and your observations of the current competitive landscape.

KRUBASIK: There are a few things that everyone talks about, like digitization. But also the restructuring of all energy-related sectors, including the automobile industries. And as a third overarching theme, we find an acceleration of innovation due to omnipresent abundant computing power. It is not only people like Ray Kurzweil² who argue that innovation is exponentially accelerating, and who says that since 2000 we have had as much innovation as we had in the 100 years before. Stemming from the fact that many different science fields and technology developments grow together – for example, biotech and electronics feeding each other, partly via computing power in analysis, modeling and simulation, partly via actually connecting to each other on chips. So we are in an age where many surprises can happen, and where this skill of agility becomes very important due to those many possible surprises.

PRANGE: If you're talking about innovations and speed, what are the most significant innovations in the last few years, let's say in terms of disruptive, radical, or very significant impact?

KRUBASIK: I suppose most of those innovations that we are talking about are driven by the fact that computing power has increased significantly at affordable cost and has penetrated all other fields. The fact that we can today have autonomous driving is a mixture of powerful sensors, computing power, and algorithms. So much computing power at our hands allows so many applications that we have been dreaming of earlier, like artificial intelligence, which was a dream of the '70s, and can be realized today, or controllable artificial limbs.

PRANGE: And these times may require new concepts or new thinking – and agility might be one of those new ideas. Have you come across the notion of agility before, and if yes, what does it actually mean to you?

KRUBASIK: The word *agility* has not been used so much but the word *flexibility* always has. And the concept of managing uncertainty is also related to this discussion, which is a new discussion that in fact is very old.

PRANGE: When did you first observe the need for flexibility or managing uncertainty, and why do you think it is so important today? If you look back ten years ago, we also had tremendous challenges, but it seems that the quality of these challenges has changed.

KRUBASIK: If we think of the '70s and '80s, we were talking about shortening development times to absorb electronic technology more easily into mechanical and electrical systems. If you had seven-year development cycles, electronics didn't fit with that. You wanted to upgrade the system including new electronic technology not every seven years, but every three years. So development time has been shortening from year to year, and today we are facing challenges not only from the accelerated electronics cycle. We find that many adjacent technologies are influencing each other and we get more innovation "in between" the original technology fields. Also, significantly more developers globally have powerful tools at hand to surprise us with unforeseen innovations.

PRANGE: You're talking as an expert in high technology. Do you think the need for agility, or as you say, flexibility is different across different industries?

KRUBASIK: Yes. I think there are infrastructures or products that have to absorb technology while providing continuity for existing users. I think it's very simple. Consider a system like Windows. They have tried for the last 20 years to continuously upgrade it, including new technology and still staying compatible with earlier systems. At the same time, they have to counter surprises by Google, Apple, Asian competitors, and successful start-ups.

PRANGE: Does that mean there is no agility without stability? That you need some sort of structure?

KRUBASIK: Actually, I think we will have both environments running in parallel. We will have industries that will try to stay compatible with past technology. That is in particular true for infrastructures. Network infrastructures are so hard to change that they will always try to change incrementally and only switch from generation to generation in leaps of seven to ten years.

There are other environments where you are very much more independent: Stand-alone products or systems for instance, in consumer goods you can very often be very independently launching a new product on the market. In many of the software application products, the famous apps, you can enter with something new anytime, and we are getting surprises left and right every other year or even every other month. The more we innovate via software on an existing hardware base, the more freedom has the innovator.

Third, I see something totally different, and that's software apps invading and partly replacing old hardware systems and their embedded software: All of a sudden, you have a new traffic information and guidance system "Waze" as an app providing similar value as the existing costly infrastructure hardware. And these are often very small companies.

Fourth, totally new applications are replacing historical approaches, like maps. You have a new map system as an app which provides you with all the hiking trails around the world in one app. Other start-ups surprise us with medical assistance systems – not far from the digital doctor. Many of these applications are purely software based, use existing internet databases and come up rather suddenly when somebody sees a need, an opportunity and puts new software technology to work.

PRANGE: It seems like agility or flexibility is seen as a recipe to solve many different problems and to increase performance. How do you see that? Is agility or is innovation directly leading to higher competitiveness and performance?

KRUBASIK: Well, innovation is inherently “change” to increase value to the customer – often not only change in technology, very often also change in the businesses system. That means innovation very often leads to more effective and more productive businesses. Therefore, innovation is a value driver for customers, but also a growth and productivity driver for the innovative supplier. Agility then is the skill to quickly react to new technology and market trends – a very valuable skill.

PRANGE: If you consider agility, flexibility, innovation, these concepts have very often been associated with speed and adaptation, but maybe too much . . . what about the inverse – sitting back and reflecting – just do nothing for a moment, is that equally important to be successful?

KRUBASIK: I see this whenever we get into the field of ethics of innovation, where we have to hold back and think of the impact of new unfinished technologies, where it is hard to understand what the technology leads to. That, today, is a consideration for example in genetic engineering, nuclear waste, in robot weapon systems. Also, we need to take time to exclude all safety risks to the user and the environment.

But overall, I think speed and agility is a very high quality in successfully managing the future of businesses. Most of all, we are looking for concepts to manage uncertainty better, to not be caught on the wrong foot by a new development, whether this is a technological development, a societal trend, or a political development. In management, you always have to think about the many options which are embedded in this uncertainty.

PRANGE: Does that mean it’s the end of strategic management? The end of strategic planning?

KRUBASIK: No, not at all. This is a very important aspect in strategic management. It’s not the end of it, maybe the contrary. It’s a challenge to strategic planning to manage uncertainty.

Strategic planning has many tools to manage uncertainties. Risk management and options planning and scenario techniques are part of strategic planning. Licensing and buying technology alternatives from the outside are all helpful strategies.

On the other hand, uncertainty provides many options or many threats. I don’t even differentiate because threats immediately lead to options. The awkward part is that we seem to have too many options. You almost have to go into a financial concept to assess risk and manage options. What is the cost and value of certain options? And how much do you need in order to explore all of those options?

PRANGE: That brings me to the level of the organization. If you talk about agile organizations, that implies changes in systems, cultures, and as you say, in strategic planning as well as in leadership. How can all of these changes work together to be better prepared for “managing” uncertainty?

KRUBASIK: Structural solutions help to become more flexible and agile, e.g. separating upstream development of new technological alternatives from downstream product development (so that product developers can pick ready technologies “from the shelf and do not run into chaos with untested technological solutions”).

Most companies do not have the means to explore all options in house. As a consequence, several options will always have to be externally acquired. That means you require a powerful radar to understand all the options coming towards you, or all the threats challenging you, and then develop in-house strategies for changes, be they radical, disruptive, or incremental. And then you need acquisition strategies. You will look for acquiring certain technology options, or certain companies that give you a new business system if, for example, marketing business system changes.

PRANGE: If you look at the companies you’ve met in your business life, which of those companies have been dealing well with uncertainty, being agile in their cultures, or their people, or their systems? Are there any “typical” companies? Are these rather younger companies or older companies, smaller or larger ones?

KRUBASIK: I see that companies with a lot of cash to be deployed, like Google, try to cover their options by acquiring young companies in many different fields in order to enlarge their options or to gain further options. Many companies who follow this strategy to acquire technologies or business systems by acquiring small new companies keep these companies independent and do develop them as independent business units.

Another choice, of course, is to incrementally integrate acquired new concepts into some of their existing businesses.

For example, in automation – factory automation or process automation – companies always try to add new elements to their offering, almost completing a mosaic. Today this is often the case with software. Where it was manufacturing automation in the past, it is now more design software, integrating design, manufacturing, and service in Industry 4.0 systems.

Earlier you were buying factory automation competitors, then you were buying “manufacturing execution software.” Now you are buying design companies to integrate the full chain from product design to manufacturing to service. So we see that the new visions of automation are gradually, step-by-step, expanded. And innovation – even destructive innovation – is absorbed there. Industry 4.0 in many cases will be a gradual, step-by-step-by-step continuous expansion of digital technologies in the whole supply chain.

PRANGE: What are the companies that come to your mind that are very well prepared, that are very agile?

KRUBASIK: I hesitate to name the usual. I mentioned Google because I know that Google is throwing money at so many different options. I’m not really sure whether one could still mention Apple in this context.

I don’t think the typical large companies are the first ones that one would mention because very often they are stuck with their past successes, heavy investment in mature technology, and management full of the heroes of the victories of the past.

Some have gone through complete transformations like IBM from a hardware developer to a solutions and software and services company. Also IBM has always

applied the tool of Independent Business Units. That, I would say, counts as agility. But such culture change needed a revolution from the top.

Historically, also Siemens has provided good examples, building a large empire on 150 years of innovation – most flexibly expanding their technology applications from telecoms, to electrical motors to medical technologies, lighting and semiconductors. The last twenty years agility has more been shown in portfolio focusing, IPOs, and spin-offs. But in parallel a new wave of technology accelerators, Technology-to-Business Joint Ventures with University Laboratories and now a new innovation initiative called “Next 47” (named after the founding year 1847). This stimulates a wave of new ventures internally and investments externally.

Siemens as innovator is also good in gradual absorption of new technologies from outside, continuous expansion of the horizon of technology. If you look closely, you might find that the company is doing a lot of this step-by-step expansion of their mosaic in automation. And we find similar strategy for the entire digital world, be it in the hospital, the factory, or buildings and infrastructures. We might call it agile. Of course, adding a new piece of technology from the newest trend around the world is less visible than revolutionary anti-iPhone concepts from consumer goods suppliers or a robot dog from Boston Dynamics.

PRANGE: We’ve been elaborating on technology before as being a driver of agility. What about people and leadership – how far are these important for a company to be agile and competitive?

KRUBASIK: Let me add a bit to your previous question regarding forms of organization systems, cultures, and leadership. I think there will be a disadvantage for very hierarchical organizations, with many decision levels, where changes are difficult due to the many hurdles as you go through the pyramidal structure.

Larger companies are very often clearly positioned in the market, and they don’t want to disturb their customers with seemingly strange experiments that are contrary to the existing system.

Agile companies are often small. Small is very fast in decision-making. Seeing an opportunity and implementing it, and going to the market very quickly. No existing customer base and technical installed base to protect.

So the larger ones will have to find a way to counter these attacks from the very small and agile companies. One way is indeed to copy the structure and to add a wing of small business units that are left rather independent and that may even attack the core company with different concepts. Both – old and new units – will see future opportunities but they will go after them with different tactics. The existing core businesses will do this incremental adding while the new business units will address new customers or existing customers from a totally different side, and this may even be in conflict with the existing businesses. The winners of the existing technologies will have to learn to cannibalize themselves, to avoid newcomers doing it to them.

PRANGE: So this means implementing the idea of corporate-, or intra-preneurship, to make sure that you have internal innovation in large conglomerate companies, rather than only in the small start-ups?

KRUBASIK: Yes, and it is very important that it is not the winners of the old technology having the say over the young companies. The winners of the old technologies will

always think about the massive investment they have made in their carriers, in factories and customers. And they will challenge their new young technologists until disruption is almost destroying their company. But this is generally too late.

Instead, you want some aggressive independent units in the corporate conglomerate that can develop totally new technologies and new approaches with new (and old) customers.

PRANGE: So, how do you make sure that these two units or layers within the company communicate and mutually benefit from each other? Or do you really want to keep them separate?

KRUBASIK: Now, there is one thing that is organization and decision-making, the other is innovation networks. You don't want to have corporate decision-making dominating these small new units. You want to give them as much freedom as possible, almost as an independent company.

On the other hand, you want to share as much technology as possible, in the sense that you want to diffuse it through the corporate network. And this is a difficult bridge but I think the digital age may provide part of the solution. We will have a technology innovation network, that means, an information network that allows participants in the corporation to understand where which skill or technology is available, and what experiences have been acquired. Not only one company is begging "if we only knew what we know!"

PRANGE: To be able to tap experiences in all different places of the organization may be a key element in an agile company. You seem to imply that there also needs to be a certain culture for sharing information?

KRUBASIK: Yes, I think, networking is important – communicating via IT networks, but also in the form of innovation forums, prize-giving ceremonies, internal technology conferences. This is all the more needed between central research and product divisions: transfer projects and jointly staffed transfer teams can help there.

A flatter organization helps. You could call it a network organization, but more so it is an information network and not so much a network of central control.

PRANGE: You have worked as a top manager for many years. Do you think that leadership qualities are all about change in these very uncertain times? And will different leadership skills be required in the future?

KRUBASIK: We need leaders with a very open perspective; scouts at the top, always wanting more for the customer, always looking out for new stuff, always looking out for danger . . .

You may have heard about the book, *The Attacker's Advantage* by Richard Foster. The core idea behind this book is that the established market leaders and winners in a certain technology have to watch out not to be their own enemies by underestimating the newcomers and new technologies' potential by trusting so much in their own strengths. The defender does not only have strengths, but also shackles around his legs and hands due to all the investments he has made – investment in factories, in customers, and in skills.

A newcomer doesn't have anything to protect. So he can come in with a new story. And he doesn't have to explain to the customer why he is talking differently today from yesterday, because he's only giving a new story. He's betting everything on that new story, the new technology, or the totally new network concept, or whatever. So, the defenders have to learn to expand the existing business and, at

the same time, attack it. It is a split-mindedness that is needed if you're top of several competing technologies. You have to feed the cannibal and feed the defender too.

PRANGE: You already mentioned that the network organization has become important. Can you think of any other changes that organizational structure will be subject to? And will there be any organizations in the traditional sense in the future?

KRUBASIK: Obviously, to react fast, many people are now uncoupling some of their businesses from a central control, giving them more independence as independently listed subsidiaries. Often a central board cannot be as tough with an internally embedded division, as the market, investment analysts, and competition are towards an independent company. As soon as this division is free and to a large part controlled by independent shareholders, it may be able to act much faster than if it is subject to a benevolent internal executive board.

To find the right combination of the two concepts is a skill. You want to give your units more independence, maybe even partly introduce new shareholders and only keep 60 percent to allow more influence of new shareholders. You also want to give them more independence to address certain markets. You might accept to have internal competition, even out at the customer site. That's what I call cannibalizing: if someone comes with a totally new concept against an established concept, involving the same customers of the corporation.

PRANGE: If you mirror this against the current environmental conditions – and I am in particular talking about the legal and governmental situation in Germany – is this sensitive enough to meet these changes?

KRUBASIK: Now, governments are of course always slower than the market and regulation is also always slow. Slow means it comes after some of those changes have been having very high impact, have damaged some of the old regulated companies, and only then the uproar is big enough to change laws, legislation, regulation.

I feel that government today influences companies in all types of regulation taxation, be it safety regulation, how many parking spaces you need and whether garages have to have windows, things like that. All of that can be done to large corporations more easily, because they can absorb this more easily.

Small companies have a harder time with all these regulations, not only because they aren't so well equipped to have all the admin staff in the company, but also because they want to move fast without the shackles of this regulation. If governments really want to foster start-ups in this new agile industry, they will have to revoke some of the regulations that have been originally invented over the last 100 years. That means some more developed countries, particularly some European countries with more regulations, have a handicap versus emerging nations. Some of it will probably have to change or be thrown overboard.

PRANGE: Also if you talk about the German concept of "Betriebsrat" (work council),³ which is an important one . . .

KRUBASIK: Talking about the Betriebsrat, it has two very different levels. One is at the level of the factory or business unit. There the Betriebsrat is a very close to the business needs and cooperates productively to grow the business profitably, at least in the form that we have developed in Germany. It is something that many countries are envious of. We don't have so many strikes. People talk about

problems and improved options to each other. They find agreements if there's a conflict. If there is much more representation of the workers, there is also more motivation of the workers this way.

Then there is a different level, which is in the supervisory boards. To have Unions and Betriebsrat 50:50 represented on supervisory boards is a model we have never been able to export. So I could imagine that, what we call, equal representation of capital and labor at the board level is generally contributing to the heaviness of the big ships (so to speak) that we have. It protects outdated structures for too long and will make companies less agile.

PRANGE: Considering your experiences in different countries, do you see that some countries are more likely to deal with uncertainty? And is there anything like an intrinsic cultural trait?

KRUBASIK: My first tendency would be to say no, this is a corporation's culture characteristic. There are some companies that are continually renovating themselves. And I see GE as well as Siemens, for example, as two such more-than-160-year-old companies that have survived so many turbulences and changes in technology, and in markets, and in politics because they have been able to adapt, and to absorb new things.

So many 100-year-old German companies are represented in China, in the US, in many countries around the world, and are taking in new local and global trends and new influences and are trying to adapt to them. So I suppose many of those companies have proven to have almost some built-in gene to adapt to change and absorb new trends.

On the other hand, there is always a revolution at the bottom of the competitive pyramid; there are so many new start-ups trying to find their way up and fight the established ones. So we will have a revolution coming from the bottom from many of those newer companies from time to time. Some will fail, but others will survive, and we have a continuous renovation of industry that way. Which also means that the 100-year-olds never have a guarantee for the next 100 years, that they aren't going to be replaced, which does happen. Sometimes, like Kodak for example, they are rapidly replaced by newcomers that were not visible 30 years ago.

PRANGE: You were talking about the reputation of Germany. Do you think that Germany will be able to maintain this positive reputation abroad?

KRUBASIK: Yes, I believe so. I'm not necessarily talking only about products, but also factories and service abroad first; the attitude to produce high quality and to drive a technology to perfection. That, I think, is built into the German industrial ethic, and that will always transfer to other countries. Just recently, when I was in Shanghai, I had a chance to visit one of my earlier factories in Suzhou, which is one of the best automated, with all the production management systems installed, like our factory that is close to Regensburg here in Germany, and the two are basically competing. Who is more advanced than the other?

So, typical German companies are translating or transferring their management system abroad. And I have seen this many times, that in a global productivity initiative you cannot have a totally different factory in Guadalajara in Mexico or somewhere near Rio in Brazil, or in China or in Japan. You will always have a corporate style, a management style for innovation leading to similar productivity.

I'm saying this also because some of our German unions at times think that all these foreign plants will have a disadvantage because they're so far away and in different cultures, but that is not true. Most of the European companies that are working abroad have managed to transfer their management style and their quality abroad and make a plant in Indonesia just as productive as a plant in France or Germany.

PRANGE: So these are the qualities that people admire in German leadership and quality. However, I guess that most countries also have some advantages that the Germans can learn from. If you look at this more holistically in terms of, for instance, an agility or uncertainty management index, where do you think different countries would score? And are there countries that are better than the others in some aspects, and we can learn from them?

KRUBASIK: Obviously, younger countries that are less bound by existing infrastructures have an opportunity to surprise the rest of the world. Spain has now the longest high-speed train network and China will have to be the first to do away with fuel burning cars in megacities. They do not have shackles of established structures and beliefs. Which is also a reason why I'm telling all of our German companies, "Do not hesitate; go to the hottest competitive countries. Learn to survive there, and to be able to compete there like a local company." If markets were open, this could help local and foreign companies.

By being present in the most disputed and most hectic environments, we will not only learn to be competitive in such environments, but also to bring knowledge back to the developers at home and react fast to trends that come from these parts of the world. In exchange, we bring management methods and technology to these markets.

PRANGE: What are those hottest countries you're talking about?

KRUBASIK: I consider coastal China, Japan, and Korea definitely some of them, but also California or Massachusetts. Faster changes that European companies should be part of. The car industry is definitely one such industry that is subject to environmental changes and changes that are obligatory in China's megacities. Also, consumer goods industries are moving fast there. In Japan and Korea, new technologies are being picked up by the population very fast. Asian consumers seem to be more curious, more ready to test new things than people in more saturated and developed consumer markets.

In California and Massachusetts, you can see many very small companies that are now springing up in the field of robotics, autonomous machines, and artificial intelligence. Whether this is all the internet companies or Tesla in Silicon Valley or Boston companies like *Rethink Robotics*⁴ that are in this field.

PRANGE: That brings me to my last block of questions. Do you see any changes, any challenges in training future managers? Do we need different types of education or universities than we have today in order to meet these challenges?

KRUBASIK: Where in the past we have had universities that were doing more theory and conceptual thinking, today we have complemented them with some very practical courses – in particular in business management. So case studies and industry experience brought into university become more natural. What we trying to do today is – that we don't teach our students not only the way businesses are run successfully, but help them to understand that they will be hired for change; to

change it for the better; to start with the assumption that whatever they find in their job environment will not be perfect, and there are world-class benchmarks to be found. In management processes and technological innovation!

So, encourage people to not take anything for granted and as perfect. Learn fast what world-class means in a certain sector or function, and learn from others very fast. And change the business for the better. So we are training people as active change agents, not to execute a fixed scheme that they have learned at university.

PRANGE: All right, this brings us to the end of the interview. Thank you very much!

Conclusion

With the many changes we are exposed to, coping with uncertainty probably poses the largest challenge. In highly uncertain and complex markets, managers have to make the spread between being first to market and moving to product launch only when success is nearly guaranteed. This is what Edward Krubasik described long ago in his 1988 *Harvard Business Review* article, where he mentioned that, “the danger for managers lies not so much in their being whipsawed between these competing demands as in their tendency to act as if no such tensions existed”.⁵ Under circumstances where connections between behavior and results become blurred, creating a large array of options is a viable solution because there is no guarantee of one option turning into a success. “In management, you always have to think about the many options which are embedded in this uncertainty,” says Edward Krubasik, and “every threat is an opportunity.” *Agility*, as we introduced it in the introductory chapter of this book, does exactly this – it builds and orchestrates a variety of options, decides which ones to seize, and ensures flexible adaptation. Thus, agility helps to deal with uncertainty and this is important because a manager today should never feel safe but should be open instead to opportunities, whenever they appear.

Innovation can be one important output of agile behavior. Industry reports⁶ show that agile methods not only boost new product development in software but also penetrate all other corporate functions. Today’s major challenges result from the fact that, unlike in previous centuries, innovation increasingly emerges “*in between*” technological fields, which requires collaboration between larger established players and newcomers to the market. Often, this involves the creation of new industries, like multimedia, biotechnology, and optoelectronics, or products that draw from the expertise of different specialized companies. While smaller companies have the advantage of being more flexible, this is not to say that larger companies are not adaptive. Mentioning the examples of Siemens and Microsoft, Edward Krubasik notes that companies can be very flexible by adjusting incrementally and that those companies that gradually absorb new technologies and expand in a

step-by-step manner can be very successful in being agile. However, as he observes, these incremental changes normally receive less public attention and this is why big conglomerates are often considered less agile. For instance, one of the founding fathers of the Agile Manifesto, Ken Schwaber, spoke for many when in a blog post he questioned whether a big corporation like Microsoft would ever be able to emancipate itself from the bureaucratic tendency to “view people as assignable, parsed, optimized resources”.⁷ Adopting a broader view of agility that includes different variations of speed, adaptiveness, and change may just prove that agility is not a matter of firms’ size.

However, we should not ignore how important speed is and has always proved to be. Companies need to find ways of adapting their structures, as Edward Krubasik says, managing “both these incremental continuous upgrades while also doing some revolutionary, totally different things.” One solution is the decoupling of structures within corporate conglomerates to facilitate entrepreneurial thinking. This can lead to accelerated action while maintaining the existing core business, which continues to add pieces to the mosaic incrementally. The latter option may include strong acquisition policies to increase the scope of potential developments – one option that is often adopted by larger and financially savvy companies.

While an increasingly complex environment may not lead to a demise of strategic management, but rather to new ways of dealing with it – with agile management being one potential reaction – it certainly evokes questions about revising legal and ethical guidelines. This includes both higher flexibility, but also higher degrees of responsibility to evaluate the potential consequences of technological developments.

NOTES

- 1 Information about the High-Tech sector is taken from the following reports: Deloitte (2016). Technology industry outlook. www2.deloitte.com/us/en/pages/technology-media-and-telecommunications/articles/technology-industry-outlook.html accessed November 26, 2016]; KPMG (2015). Technology industry outlook survey. www.kpmg.com/US/en/industry/technology/Documents/technology-industry-outlook-publication.pdf [accessed November 26, 2016]; McKinsey Global Institute (2016). Digital globalization: the new era of global flows, Report, February 2016 www.mckinsey.com/business-functions/digital-mckinsey/our-insights/digital-globalization-the-new-era-of-global-flows [accessed November 26, 2016].
- 2 Ray Kurzweil is an American author, computer scientist, inventor, and futurist. Aside from futurism, he is involved in fields such as optical character recognition (OCR), text-to-speech synthesis, speech recognition technology, and electronic keyboard instruments. He has written books on health, artificial intelligence (AI), trans-humanism, the technological singularity, and futurism. Official website: <http://www.kurzweilai.net/>

- 3 The Betriebsrat (work council) is a “shop-floor” organization representing workers, which functions as a local/firm-level complement to national labor law negotiations. General labor agreements are made at the national level by national unions and national employer associations, and local plants and firms then meet with work councils to adjust these national agreements to local circumstances. Work council representatives may also be appointed to the Board of Directors; Weiss, M. and Schmidt, M. (2008). *Labor Law and Industrial Relations in Germany*, Fourth edition. Dordrecht, NL: Kluwer.
- 4 Rethink Robotics is a company founded in Boston in 2008. It is well known for producing Baxter, a robot that is used in factories and can be “taught” new skills; www.rethinkrobotics.com/
- 5 Krubasik, E. G. (1988). Customize your product development. *Harvard Business Review*, November–December: 46–52, here p. 46.
- 6 Rigby, D. K., Berez, S., Caimi, G., and Noble, A. (2015). Agile innovation. Bain Brief. www.bain.com/publications/articles/agile-innovation.aspx [accessed November 28, 2016].
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