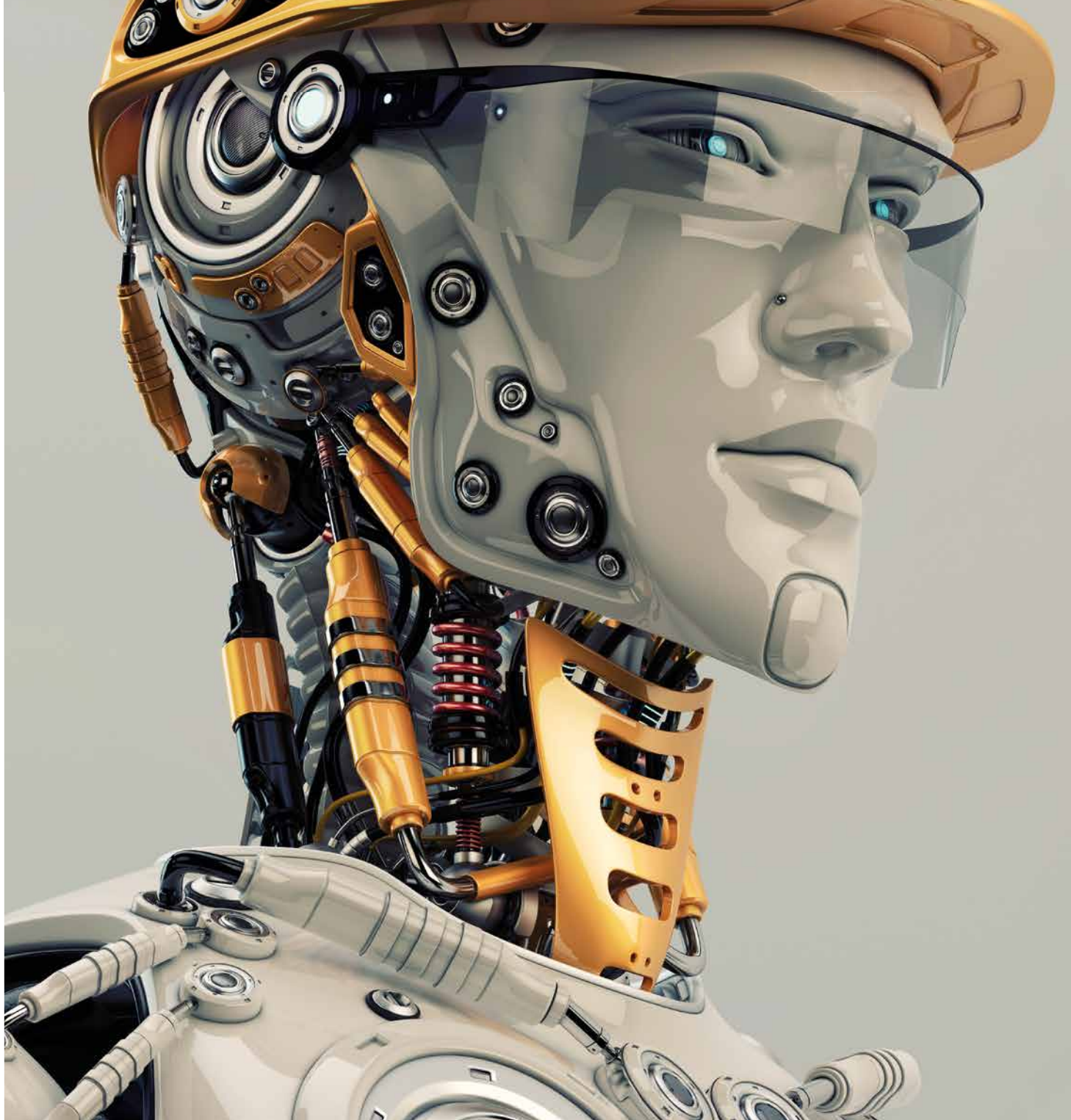


update



**Auto safety needs
data security**

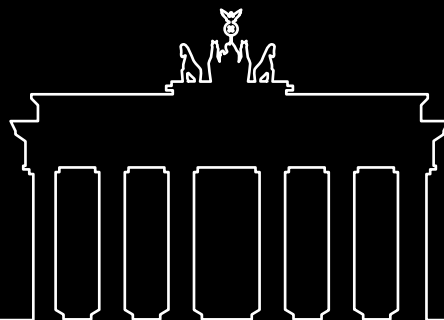
**Old families,
new futures**

**We can't always
be "smart"**

12/17

EXTREMELY
SMART

ESMT BERLIN
RANKS #8
WORLDWIDE



Artificial intelligence, the Internet of Things, autonomous vehicles, wearables, cloud computing – what seemed to be the stuff of yesterday's science fiction is today's technology and changing what we expect of tomorrow's business world.

should follow to attract, satisfy, and retain customers in increasingly fast-driven, global markets.

In response to the developments of the “New Economy,” the Organisation for Economic Co-operation and Development (OECD) published a piece on the role that educators can play. “The machines and sophis-

EDITORIAL

With the coining of the term Industry 4.0, Germany both acknowledged and welcomed this digital transformation in traditional manufacturing. Rather than viewing the technology as an intruder, e.g., as something separate from and destructive of older business models and processes, firms are embracing the change as an evolutionary step towards a sustainable business future.

“Smart industry” is, by definition, technology driven, but it is also responsive to consumer and market demands in many unprecedented ways. The revelations of big data analytics support a consumer-centric approach. The ways customers engage with products and services – increasingly via mobile technology and internet-based platforms – is generating a wealth of insight into consumer behavior. Beyond revealing how these customers are adopting (and adapting to) technological innovations, data analytics are illuminating the paths that companies

ticated ICT equipment are useless without the competence to exploit them,” wrote the OECD. “Nurturing this competence is in part the job of schools and colleges, where the foundations of lifelong learning and ‘technological literacy’ are laid.”

As evidenced by our school's leadership and social responsibility mission, as well as our commitment to technology management, ESMT Berlin shares this belief. In our degree and executive education programs, we are supporting future leaders who will navigate the future risks and opportunities of smart industry. This includes not only business, but also their role in governance, shaping how business technology can serve the public interest and deliver global solutions for a sustainable future.

In this edition of the ESMT Update, we explore smart industry. How are small and medium enterprises, especially the world's hidden champions, integrating technology into their traditional structures to become future-ready? In what ways are regulators and consumer groups asking us to be mindful of data privacy and cybersecurity concerns even as technological innovation tests the limits thereof? How will research and education challenge what we believe is “smart” about Industry 4.0 – whether old myths or new ones?

Please join me in flipping the page. ■



Jörg Rocholl
President, ESMT Berlin

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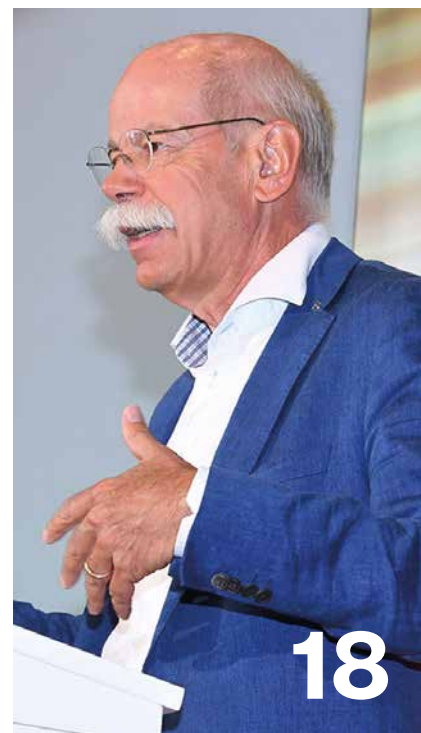
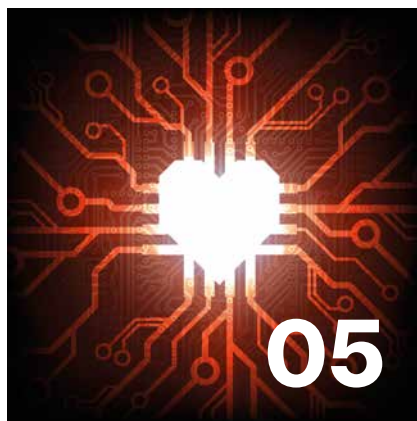
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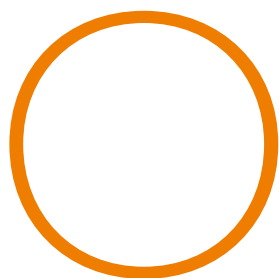
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Murder by Health Hack

Medical device manufacturers, regulators, and privacy advocates must do more to counter security flaws that endanger patients.



In August 29, the US Food and Drug Administration (FDA) issued a recall for nearly half a million pacemakers made by Abbott. The agency found that the devices could be hacked to control pacing or deplete the devices' batteries, with potentially fatal consequences. All patients whose lives depend on one of the affected pacemaker models, approximately 745,000 persons worldwide, now have to visit their doctors to receive a firmware update that patches the security flaws.

Regular patching of cyber security vulnerabilities, a practice most people know only from their desktop IT systems, is on the way to becoming a common procedure in health care. Modern medical devices are equipped with increasing computational power and wireless connectivity, which can offer safer, more efficient, and timely healthcare delivery. Yet, these technologies will also expose them to the same network and information security (i.e., cyber security) threats as other IT systems. The management of these risks requires the extension of existing governance mechanisms, including regulation, standards, and industry best practices to encompass cyber security.

Problems and warnings go unheeded

For over a decade, researchers have been warning that the level of cyber security in safety-critical devices is alarmingly low – the Abbott pacemaker recall is just the latest in a series of incidents. While no one is known to date to have caused a death by hacking into a pacemaker or insulin pump, several research-

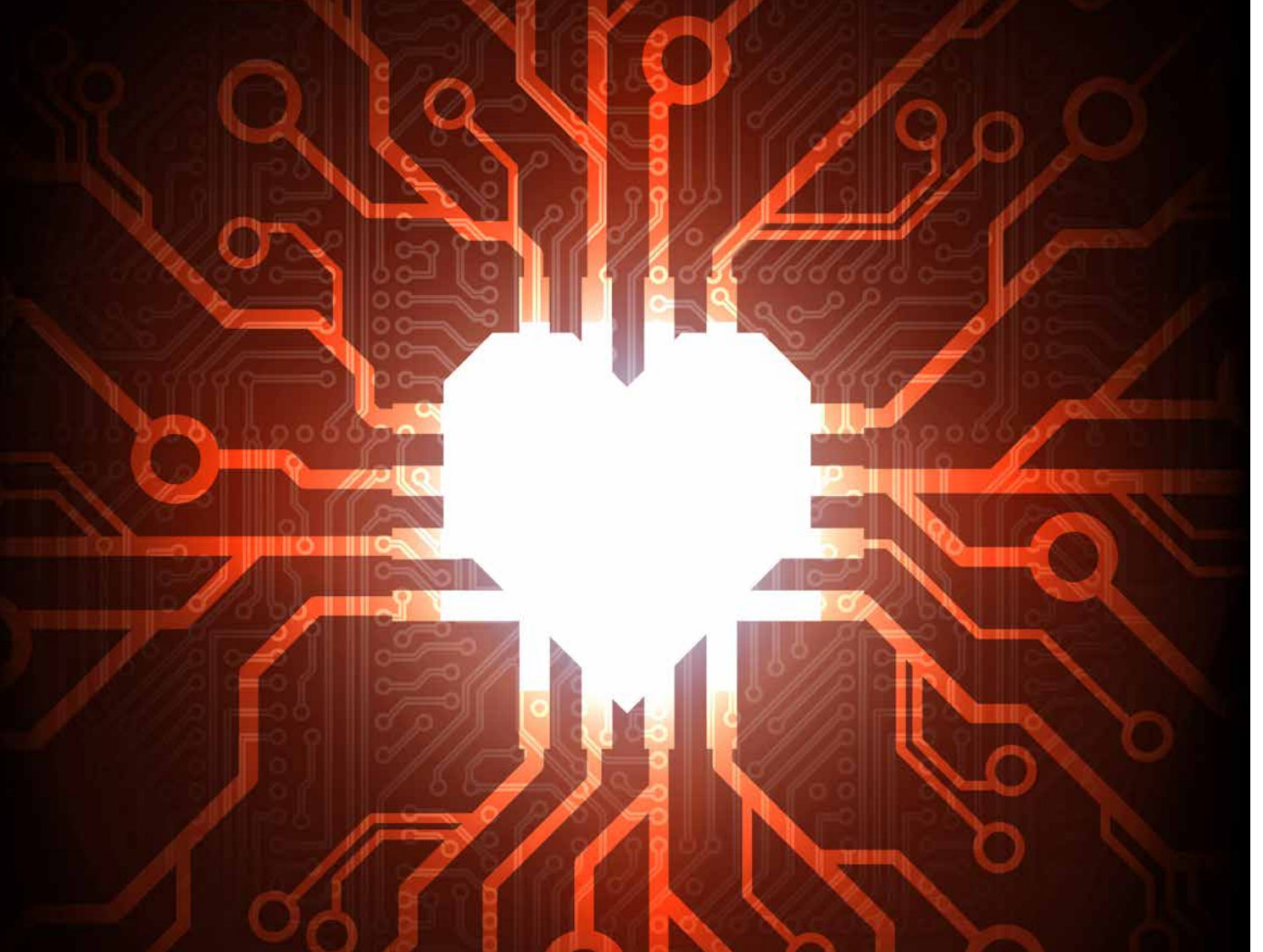
ers have demonstrated that it is possible. In 2008, a team of researchers first demonstrated attacks against implantable cardiac defibrillators. With the help of a commercially available device programmer, the team was able to extract a patient's private data and reprogram the pacemaker to deny service.

Since then, several have demonstrated different possibilities for hacking pacemakers and insulin pumps. In May of this year, researchers from the security firm WhiteScope discovered a total of 8,665 open and known vulnerabilities in third-party software libraries implemented across four different pacemaker programmers from four different manufacturers. This is a failure of enormous proportions.

Not only implantable but also stationary hospital devices are vulnerable to hacking. A 2014 report by the SANS Institute concluded that 94 percent of healthcare organizations

745,000
patients affected by the
Abbott recall worldwide

have been the victim of a cyber attack, including attacks against medical devices and infrastructure. Other reports have shown how vulnerable medical devices served as conduits for hackers to attack hospital networks. The "WannaCry" ransomware cryptoworm, which compromised the networks of many global corporations earlier this year, also affected medical devices in hospitals and prompted the US Industrial Control System Computer Emergency Response Team (ICS-CERT) and



8,665 vulnerabilities in software researched by WhiteScope

several medical device vendors to issue security alerts about vulnerable devices.

These examples and others show that cyber security risks in health care are systemic. Many medical devices lack even basic security features, and the resulting risks are externalized. Unfortunately, the parties most affected by the risk – the patients themselves – can do little to improve the security of the devices that their own health depends on.

Oversight and standards lag behind

The ultimate responsibility for the mitigation of such risks lies with device manufacturers and suppliers. Yet while device makers are

aware of the risk, only a few seem to act. According to a 2017 study by the Ponemon Institute, a data protection research firm, 67 percent of device makers surveyed believe an attack on one or more medical devices they have built is likely, but only 5 percent conduct annual cyber security tests of released devices.

With the private sector slow to deal with the problem, regulation is becoming crucial for establishing an overarching legal framework and security requirements for manufacturers. In addition, standards and technical guidelines devised by international standardization bodies can provide guidance for the fulfillment of those requirements.

So far, regulation and standards for medical device safety and performance have not kept pace with digital innovation. While medical devices are highly regulated for safety and performance in most countries, those rules insufficiently address cyber security. Hence, regulators and standardization bodies need to

update and extend existing frameworks beyond safety requirements to security.

Political bodies in the US and more recently in Europe have started to take action, but much remains to be done. So far, the FDA has assumed a leading role in this field. It has issued two sets of guidelines for cyber security in medical devices, a pre-market guidance in October 2014 and a post-market guidance in December 2016. They are intended to support manufacturers in fulfilling the requirements of the pre-market approval and post-market monitoring processes with respect to cyber security risks throughout a product's entire lifecycle.

However, implementation remains poor. The aforementioned Ponemon Institute study found that only 51 percent of surveyed device makers follow the FDA's guidance to mitigate or reduce inherent security risks in medical devices, and only 44 percent of health organizations follow the guidance. The FDA's enforcement mechanisms, such as the issuance of recalls and safety notices, as well as liability for device failure and reputational damage will raise the cost of bad security for manufacturers.

The European Union (EU) and national oversight bodies in Europe have offered little guidance as to how medical IT cyber security practices and mechanisms should look, raising the specter of an uneven regulatory patchwork across the continent. Currently, moderate to high-risk medical devices' conformity with safety and performance regulatory requirements is evaluated by certification bodies and overseen by national authorities. If they conform to the requirements, they obtain a CE (Communauté Européenne) label and can be marketed in the entire EU. In May 2017, the EU adopted a new Medical Device Regulation (MDR), which for the first time specifically requires manufacturers to develop devices in accordance with "state of the art" IT security requirements. But the regulation offers little guidance as to how the practices and mechanisms to be followed by manufacturers should look. That is a problem because standards that combine or complement established criteria for the functional safety of medical devices with appropriate IT security requirements do not yet exist – so there is no established definition of what "state of the art" means for the IT security of medical devices. Therefore,

manufacturers and certification bodies that evaluate devices for their safety are left to define their own medical IT security certification and evaluation frameworks. This creates a risk that cyber security standards in health care are fragmenting across Europe and even within EU member states.

Testing, certification, and reporting needed

Public authorities, manufacturers, and certification bodies should develop common European baseline IT security criteria as a component of the medical device certification process. The European Commission has recently proposed an EU-wide cyber security certification framework that could serve as a basis for the certification of security properties of medical products and processes. Within the framework, medical-device-specific schemes and security requirements could serve as a basis for evaluation, testing,

Just **5 percent**
of Ponemon's survey
respondents are conducting
annual cyber security tests

and certification of cyber security along with other medical system requirements. Such schemes should be harmonized with other international standards as much as possible with the goal of creating internationally applicable schemes that also lower device vendors' transaction costs.

Other guidance can be deduced from international standards for the secure design and development of software components, FDA guidelines, and existing guidelines on Industrial Control Systems (ICS) security. ICS properties are in fact similar to those of medical devices since both are cyber-physical systems, in which embedded computers control physical devices' interactions with their environments. The measures used to secure embedded computer systems in ICS are equally applicable in the healthcare context. Examples for guidance documents include the international draft IEC 62443 standard series

on industrial network and system security, the US National Institute of Standards and Technology's (NIST) ICS Security Guide, and the proposed European cyber security certification framework for industrial automated control system components.

In addition, oversight agencies should make information about IT security risks and incidents in medical devices publicly available. At present, national authorities need to submit information about safety incidents to the European Database on Medical Devices (EUDAMED), which is only accessible by EU institutions and national authorities. Per the MDR, most information submitted to EUDAMED will be public in the future.



Medical device security should not be an afterthought.

Most importantly, medical device security should not be an afterthought but be designed into the devices from the start. The design of medical devices should follow proven secure lifecycle standards and secure supply chain management practices. All off-the-shelf hardware and software integrated into devices should be trustworthy and provide high technological assurance. Connectivity should be reduced to a minimum, and safety critical system components isolated from other potentially vulnerable components within the devices.



Isabel Skierka
Research Associate, Digital
Society Institute (DSI), ESMT Berlin

Moreover, manufacturers should operate a vulnerability reporting program through which they collaborate with third parties who discover software security flaws. They should operate an effective and usable patch management system. Once a vulnerability is known, devices need to receive timely software security updates. Since software updates themselves bear security risks if they interact with the use environment in an unforeseen way or render systems unavailable, they should be tested in use environments before being deployed. Moreover, device makers need to implement secure channels for the deployment of updates in order to prevent their manipulation.

All stakeholders – device makers, health organizations, and certification bodies – should engage in information sharing about vulnerabilities and threats with Computer Emergency Response Teams (CERTs), information sharing and analysis centers, and other potentially affected third parties.

Apart from medical device regulation, regulatory frameworks for critical infrastructure security and data protection play important roles for cyber security in health care. The European Network and Information Security (NIS) Directive, which has to be implemented in European member states by May 2018, requires operators of essential services, including hospitals, to implement minimum IT security standards and to notify of security breaches. The EU General Data Protection Regulation, which EU member states also have to implement by May 2018, will also apply to software and medical device vendors, as well as to health organizations and makes security and privacy by design and default mandatory.

In the long term, medical devices will be part of a ubiquitously interconnected clinical care process in which data will be continually exchanged and processed with the aim of making health care more effective and efficient. Technological innovation in health care does not only offer great health benefits, but also economic opportunities – according to a Roland Berger consultancy firm study, the digital healthcare market is set to grow at average annual growth rates of 21 percent until 2020. These developments will eventually rely on the dependability of communication and computing systems, whose groundworks should be laid before it is too late. ■

We can't always be "smart."

“

I admit, the “everything will be digitized” credo is catchy. But the world just isn’t that deterministic.

Take the book market, where in many countries the share of e-books has plateaued for years. Take car buyers and sellers, who love shopping online but insist on seeing, touching, or driving the cars before making any commitment. Or take education, where senior managers and MBA students often favor face-to-face programs over e-learning.

Customers prefer that certain things stay in the real world. The credo’s fundamental flaw is thus that it leaves out the key driver of managerial decisions: customer need. Therefore, my better version of it would be: “everything the customer wants to be digitized will be digitized.”

Instead of digitizing for its own sake, companies need to carefully set the boundaries between online and offline realms and manage these boundaries effectively. That is, companies should not strive for maximal digitization, but for optimal digitization.



Johannes Habel

Associate Professor and Program Director, ESMT Berlin

Staying Strong in Disruptive Times

Hidden champions are reinventing themselves while remaining true to the past.

A hidden champion is defined by three criteria,” writes Hermann Simon, the German author and influential business thinker who coined the hidden champions term. “One, a company has to be among the top three in the world in its industry, and first on its continent; two, its revenue must be below €5 billion; and, three, it should be little known to the general public.” According to Simon, there are 2,734 hidden champions worldwide, of which 1,307 are German.

That Germany is home to so many of these niche-focused companies is not coincidental to their success. According to Simon and others who have studied the German phenomenon, successful factors include deep and abiding ties with employees and communities, strong collaborations with local academic and scientific research institutions, an entrenched apprenticeship system for teaching trade to youth, and a market-driven research and development strategy that far outpaces their rivals in the corporate sector. An understanding for what hidden champions have and what they do might strengthen both competing corporations and hidden champions alike.

Old families, new futures

In every four of five cases, a hidden champion is owned or managed by a

family. Most of these companies are not young – 61 years old on average – although some are more than 200 years old. While grounded in what some may label “a model of the past,” these companies are at the forefront of a thriving economic future.

Frequentis, a Vienna-based company founded in 1947, is a typical example. Serving its customers around the world, they focus on control center solutions in air traffic control, both civil and defense, as well as in public safety, public transport, and maritime. While they only employ about 1,600 people and have a turnover of 250 million euro, they are the world’s market leader in their niche, which they define as safety-critical communication. Not known to the wider public, Frequentis is nevertheless a well-respected partner of all major air traffic control authorities worldwide. Being closely connected with its clients, Frequentis learns from them and develops innovative solutions for new challenges.

Long-term relationships

The model underlying the mindset of the hidden champions is, compared to the one prevalent in the corporate world, more self-actualizing than economic. This has direct consequences on performance, not only that of the individual manager but also of the firm. The downside to such a long-haul mindset is the potential for inertia and path dependency. The upsides include reliability and a deeply rooted interest

in sustainable solutions for all areas, whether in customer relations, product development, resource orchestration, financing, or employee relationships.

On average, German hidden champions do not pay as well as their corporate competitors for similar jobs. While this brings into question their ability to recruit and keep top employees, experience shows that they do. The average board member’s tenure at a DAX company is approximately five years; the CEO of a hidden champion stays more than 20 years. Employee turnover is also dramatically lower. According to Simon, the long-term employee turnover rate among hidden champions is 2.7 percent; in German corporates the rate is 7.3 percent, in the US, it is 30.6 percent.

One of the underlying reasons for such high retention rates is that real compensation is in both financial and non-financial rewards. By offering job security and managerial discretion, for example, hidden champions provide more of those non-financial elements and, consequently, have an advantage when it comes to salary when compared to short-term-oriented corporations.

Community embeddedness also contributes to long-term employee relationships. German hidden champions especially have ground themselves in the rural areas in which they are located. By doing so, they greatly benefit from a pool of qualified and motivated employees. Being embedded in a rural community offers several additional advantages:

the cost of living is lower, employee loyalty is higher, and the opportunity for “going global” is highly attractive for employees. Alternative employers are not around the corner; tenure is thus higher. Consequently, tacit knowledge develops and stays within the firm.

Financing the future

In disruptive times, future development is even more opaque than in normal times. Although choosing between short-term optimization and long-term success seems like the easier choice, integrating the two perspectives is crucial. Some of the business models of today’s hidden champions will be obsolete in the near future; they know it.

How to invent yourself anew? There are hidden champions that, instead of changing their actual business, start a completely new one on the side. They do so with the clear goal to substitute the old business with the new one. They can attempt this because they are independent from short-term requests from investors at the stock exchange or from financing institutions.

Independence is key. Hidden champions prefer self-financing to debt or external equity. Again, there are advantages and disadvantages of such an approach, including a potential lack of checks and balances on the downside, and speed and confidentiality on the upside. Furthermore, self-financing restricts the scope and speed of growth. For hidden champions, self-financing and niche focus are two sides of the same coin. With limited finances and scope, they cannot do too much at a time.

While competitors might be less restricted, self-financed hidden champions can pursue a long-term strategy focused on their customers rather than on investors’ needs. Concentrating on a niche, the hidden champion knows more about the product and service in relation to

the customers’ needs. Moreover, going global is rewarded with varying experiences around the same market and product, which in turn fosters incremental innovation. Stability and flexibility equally characterize hidden champions. This mix helps them to stay strong in disruptive times. ■

Interview

with Alexander Knauf,
Managing Director of
Knauf Gips KG



What were your impressions as you first learned about the Hidden Champions Institute?

In Germany, there are many medium-sized family companies, which are market leaders in their segment. They form the backbone of our economy. These companies think and act much more long-term than, for example, large publicly traded companies. This applies in particular to the handling of employees and investments, as well as innovations and market development. I am thrilled that, with the HCI, ESMT Berlin is concentrating on exactly the success of this German economic phenomenon.

How will you get involved in the HCI?

I will be the chair of the advisory board. The advisory board gives the HCI impetus and promotes its activities.

Why is it important that the hidden champions strategy, which is so important for many large SMEs and family businesses, is embedded in an institute at ESMT?

ESMT’s teaching is broadly designed and appropriate for large enterprises. But it overlooks the unique features that make up the DNA of hidden champions. Therefore, it makes sense to set up an institute to draw out and teach these features.

What contribution should the HCI make to the development of the hidden champions strategy in the coming years?

The HCI should capture the real levers for the extraordinary success of hidden champions and prepare ESMT graduates for careers in such medium-sized, market-leading companies.

What contribution has the hidden champion strategy - realized and systematized by world-renowned author and business management consultant Hermann Simon - given to the further development of Knauf thus far?

While we did not specifically reference Mr. Simon’s work, our strategy development always focused on the same key issues, namely employees, market development, innovation, and investment. ■

Sabine B. Rau
Founding
Director, Hidden
Champions
Institute,
ESMT Berlin



Pioneers on the Energy Frontier

Digital payments, smart contracts, and data-backed task automation technologies are driving Germany's energy transformation

Blockchain is a distributed, digital transaction technology that allows for securely storing data and executing smart contracts in peer-to-peer networks (Swan, 2015, p. IX). This is potentially disruptive, as trusted intermediaries could become obsolete. Banks and, more generally, the financial sector were the first ones to become aware of the technology via the cryptocurrency Bitcoin, which operates on the basis of Blockchain. But with the recently added possibility to conduct smart contracts via a platform called Ethereum, Blockchain has gained increasing attention outside the financial sector. Conferences on Blockchain-based cryptocurrency Bitcoin are flourishing, startup competitions are held to spot the Blockchain equivalent of Amazon and Uber, and venture capital so far has raised \$1.1bn to scale business models of the future (Weusecoins.com, 2016).

Meanwhile, another major disruption is occurring in the energy sector. Germany's energy transformation, or *Energiewende*, is seen as a role model for the move toward a carbon-neutral energy supply. The process of reshaping the German energy system had already started in the 1990s, when it was decided to expand the share of power generation from largely carbon-neutral – albeit intermittent – renewable energies. In 2011, the German government decided to phase out its nuclear power fleet by 2022, which accelerated the transition.

In 2016, approximately a third of Germany's electricity consumption was generated

from renewables. Yet, the German energy transformation is currently undergoing dramatic changes: The government has reduced financial incentives for the installation of new renewables, in particular photovoltaics. Investments in renewable energies declined from €27.9 billion in 2010 to €14.4 billion in 2016 (BDEW, 2017). The electricity price on the wholesale market is in decline, but average household tariffs remain at around €0.28 per kilowatt hour, including taxes and fees, partially because they have to reimburse owners of renewable energy installations that benefit from the feed-in tariffs. In the long run, this may lead to social frictions and fuel consumers' discontent with government policies. Meanwhile, grid interventions to stabilize the system – and the associated expenses of transmission grid operators – have risen to record levels.

After years in which the energy transformation essentially concerned the growth rate of renewables, now systemic challenges move into the focus of policymakers and executives, in particular the diverse primary energy mix in power supply and how to integrate new players with new technologies into the market. Phase two of the transformation has begun – the “Energiewende 2.0”. Can Blockchain be an ingredient for the next phase?

Current business models

The projected evolution of Blockchain in the energy sector parallels the three phases of development that are commonly coined as Blockchain 1.0, 2.0, and 3.0 (Swan, 2015, p.

IX): Phase 1.0 is characterized by the deployment of cryptocurrencies as an alternative to other digital payment systems; phase 2.0 extends the use case of Blockchain to Smart Contracts and more sophisticated financial instruments, such as bonds, mortgages, and property transactions – generally any type of transaction between two parties that can be represented through a digital equivalent; phase 3.0 will be reached when Blockchain is deployed in Big Data and predictive task automation.

In the energy sector, the trajectory starts with cryptocurrencies as a means for paying electricity bills (phase 1.0) and already extends to Smart Contracts grounded in physical transactions (phase 2.0). The following sections present some of the startup and business ideas of phases 1.0 and 2.0. Phase 3.0 is envisaged by some startups, but has not yet been reached.

First use cases: Bankymoon, SolarCoin, BlockCharge

Using cryptocurrencies for monetary transactions is the most obvious use case in the energy sector. This movement is mostly being triggered by startups, but utilities are catching up in these applications of Blockchain and are launching joint ventures and cooperations.

The value proposition that new ventures present to potential customers and investors is similar to initiatives in the banking sector: Any necessity for an intermediary between two parties is removed. For making the switch to a decentralized energy system, detaching the related financial transactions from a central control unit can be interpreted as the next step toward full decentralization.

Different use cases of Blockchain 1.0 are in the pilot project and first implementation stages. One application consists of smart prepaid meters that only release power to residential customers once they have topped up their accounts and transferred money to the electricity provider – a kind of mini smart contract. This system brings benefits for the supplier by increasing the payment discipline of its customers, but it may also have advantages for residential consumers: In countries with high inflation rates, payments result in lower expenses for them if they have paid

in advance, precluding any accumulation of debts. This idea has been developed by a South African startup called Bankymoon.

Bankymoon also uses Bitcoin as a cryptocurrency to perform remote payment transactions, using their Bitcoin-compatible Smart Meters, for example, in cash-deprived public schools. Donors from, say, industrialized



Blockchain is a distributed, digital transaction technology that allows for securely storing data and executing smart contracts in peer-to-peer networks.

countries who want to support the schools can send crypto-money directly to a Smart Meter to a school of their choice, thereby allowing the schools to be supplied with electricity automatically. During the Cambridge MIT Enterprise Forum in early 2016, one Bitcoin was transferred to the Emaweni Primary School in Soweto, South Africa, sufficient for around three weeks worth of electricity supply for the school (Higgins, 2016).

Two members of the SolarCoin Foundation have come up with the idea of an energy-backed currency, similar to the gold reserves that are supposed to stabilize “real” currencies: “The DeKo thesis is that electrical energy in the unit form of delivered kilowatt hours – a DeKo – can be a more stable asset for backing a currency than gold or debt.” (Gogerty and Zitoli, 2011) Since then, the idea has transformed into a reward system for renewable energy installations based on cryptocurrencies: “SolarCoin is already present in 17 countries and is intended to be circulated worldwide: any owner of a solar photovoltaic installation may apply and claim his SolarCoins for free. To do so, the solar owner simply registers his solar installation online with data proving the existence and operation of his solar installation.” (Kastelein, 2016) What is the value proposition behind that business model? The currency could offer “a real marketing opportunity for brands whose positioning is based on ecological values and



environmental protection” (Clapaud, 2016). However, there are some minor flaws in the concept, for example, a Megawatt hour peak has the same value as the same amount of energy during base load. The target of the SolarCoin Foundation to attain an exchange rate of \$20 for one SolarCoin by 2018 (ibid.) seems fairly ambitious, given that one SolarCoin traded at around \$0.19 in October 2017, and the deployment of photovoltaic panels all across the world may not lead to greater stability of the currency, but rather to a depreciation due to inflationary pressures.

Using the Ethereum Blockchain to facilitate charging for electric vehicles is a project that was launched by German utility innogy, assisted by a startup called Slock.it, which specializes in providing Blockchain expertise to large corporations. They call their venture BlockCharge and promise seamless and affordable charging of electric vehicles. As opposed to many other ideas revolving around Blockchain, BlockCharge has a physical artifact, the “Smart Plug,” which can be used like a normal plug but has an identification code linked to it. Users install an app on their smartphones to authorize the charging process. It connects to Blockchain, which manages and records all of the charging data. BlockCharge is aiming for a worldwide authentication, charging, and billing system with no intermediary. Owners of electric vehicles can use any electric plug to charge their vehicles. The app automatically negotiates the best price and manages the payment process automatically. Once induction charging for electric vehicles, say, at traffic lights, becomes a reality, BlockCharge will take over the entire charging process. BlockCharge’s business model is based on the one-time purchase of a Smart Plug and a micro-transaction fee for the charging process (Stöcker, 2016).

As opposed to many other startups using Blockchain, BlockCharge benefits from RWE’s (innogy) position as one of the major providers of charging stations in Europe. The utility entered the market for electric vehicle charging with solutions from their R&D team as a first-mover and has successfully exported its technology to cities outside Germany, including Amsterdam, cooperating with companies such as Daimler, Renault/Nissan, and the leading German automobile club, ADAC. As of September 2017, more than 2,200 RWE

(innogy) public charging stations for electric vehicles had been installed across Europe (RWE, 2017).

From a local exchange to a global platform

Moving toward phase 2.0, Blockchain serves as a platform for more complex services and interactions. For example, US-based startup TransActive Grid enables its members to trade energy using smart contracts via Blockchain. Its first transaction was successfully launched in early 2016, connecting five homes that produce energy through solar power on one side of a street in Brooklyn with five consumers on the other side of the street, who are interested in buying excess energy from their neighbors (Rutkin, 2016). A similar initiative is launched by a startup called Power Ledger in Perth, Australia (Potter, 2016).

Austrian startup Grid Singularity aims to move beyond an energy exchange platform and host a range of applications, including energy data analysis and benchmarking, Smart Grid management, trade of Green Certificates, a decentralized mechanism for investment decisions, and energy trade validation (Grid Singularity, 2016). The applications envisioned by Grid Singularity reach far into phase 2.0 of the Blockchain movement.

Ewald Hesse, founder of Grid Singularity, sketches use cases of Blockchain or similar decentralized platforms that can be envisioned for the future of the energy sector (Bitcoin TV, 2016). For example, collected technical and financial data can be used for real-time asset valuation of power plants. This would in turn enable refinancing or selling a power plant to a potential investor who could perform due diligence online. Other use cases include assessments of generation capacity and availability, pricing and origin, forecasting, energy trading, virtual power plants, and micro-grid management. Every household may become a single trading entity, negotiating clean or cheap energy for its electric vehicle or for residential consumption. More macro-oriented uses cases such as grid balancing mechanisms and the generation of emission certificates may be feasible.

Grid Singularity is also partnering with the Rocky Mountain Institute to establish an energy industry consortium with the goal of a more effective deployment of Blockchain



to facilitate more effective operations in the energy sector (Hesse, 2016). The new consortium aims to conduct R&D in Blockchain and energy in order to help utilities, application developers, customers, and renewable energy companies understand how the technology could support, disrupt, or transform existing business models.

Implications

Although there are a number of Blockchain systems that are successfully operating in the financial sector, most notably Bitcoin, the energy market contains technological hurdles to the implementation of Blockchain. Unlike financial transactions in cryptocurrencies, in the power sector electricity must be delivered physically. Hence, a Blockchain-based energy market has to reflect the physical configurations of power grids. If it caters for isolated microgrids and closed systems, such as commercial parks or autonomous energy communities with few interconnectors to the outside grid, Blockchain may become the dominant design. As soon as it starts interfering with the distribution and transmission system run by grid operators, it has to overcome similar hurdles that providers of virtual power plants or companies that offer demand response services are confronted with.

Furthermore, the stability of a digital energy system is crucial; it must run without internal complications as well as be protected from external interference such as cyber-crime and espionage. The impact of Blockchain on both the security of energy supply and data security has to outweigh the costs of establishing and maintaining this infrastructure. It must prove to be more effective than alternative, more centralized approaches to digitization.

The advent of Blockchain technology has to be further differentiated between industrialized and developing countries, both in the overall economic institutions of a country and in the specific field of energy. In industrialized countries, Blockchain applications compete with a highly sophisticated and technologically advanced set of existing solutions embedded in a framework of trustworthy public institutions that enforce laws and regulations and maintain checks and balances for corporations on the national and su-

pranational political levels. This environment may be missing in developing countries. In that context, sometimes even basic services, such as access to a bank account, may not be available for a substantial share of the population. It does not come as a surprise that smartphone penetration in many developing and emerging countries is as high as in industrialized nations, because applications based on smartphones offer services that overcome the economic niches that public institutions and private investors were not able (or willing) to target.

The rise of decentralized energy generation in rural sub-Saharan Africa may serve as an example of leapfrogging: Instead of costly extensions of the existing distribution grid into remote villages, electrification omits one stage of development that has characterized the evolution of public infrastructure in industrialized countries. Startups such as Mobisol and Solarkiosk offer rural customers an opportunity to have access to advanced energy services, which public utilities are not able – or obliged – to deliver.

Attracted by the quest for empowerment as well as business opportunities of Blockchain, founders are starting to establish first implementations in developing countries. As Bithub Africa (2016) states: “Africa has been adopting mobile money platforms like M-Pesa, that enable digital transactions using fiat currencies, faster than any other region in the entire globe.” Given the increasing role of digitization in energy infrastructure, it is only a matter of time until Blockchain finds its way into the energy sector across the developing world. ■

Excerpted and updated from “Blockchain in the energy transition. A survey among decision-makers in the German energy industry,” by the German Energy Agency (DENA) and ESMT Berlin.

Original authors: Christoph Burger and Jens Weinmann of ESMT Berlin, Andreas Kuhlmann and Philipp Richard of DENA.

The full report is available for download from <https://www.dena.de/en/newsroom/meldungen/blockchain-energiwirtschaft-bereitet-sich-auf-neues-digitales-verfahren-fuer-transaktionen-vor/>.



The Future of Free Trade

Navigating the path ahead is helped by a look back.

In today's volatile global political and economic environment, the question of how the free exchange of goods, services, and capital could be further improved continues to preoccupy government, business, and academia. The rejection of protectionism and the promotion of trade and investment on a global scale has been subjected to a real test. Some observers argue that free trade is experiencing the greatest crisis of many decades.

In order to assess the great advantages of free trade, a look back is worthwhile. Paul Samuelson, the American economist and Nobel laureate, was confronted by a mathematician with the following question: What knowledge of social sciences is simultaneously true and not trivial? A good dose of skepticism against the

findings of economics was evident in the mathematician's question.

Samuelson allegedly had to think long about it until he could give the right answer. He referred to the paper that celebrated its 200th birthday this year: On April 19, 1817, David Ricardo published his work "On the Principles of Political Economy and Taxation," thus shaping Samuelson's thought on the concept of comparative advantages. In this work, Ricardo noted that it is advantageous for sovereign states to enter into mutual trade. Even today, his findings continue to reinforce the idea that open markets for goods, services, and capital support the growth and prosperity of all participating countries. This realization is particularly deeply rooted in European consciousness, since these fundamental freedoms play a central role in the European integration process. Especially for Germany, open markets have been an essential precondition for the successful economic development of recent years and the creation of many new jobs. Free and fair world trade is a cornerstone of the social market economy as well as prosperity for Germany. As an example, when looking at China, Germany's most important trading partner ahead of France and the United States, this finding is equally true for the exchange between both countries. Their economic relations have developed more dynamically in recent years, even decades, than economic relations with other countries and world trade as a whole, reaching a trading volume of 169.9 billion euros in 2016.

It may therefore be surprising that criticism of free trade has increased significantly in recent years.

Even more surprising is that this criticism also comes from the US, which traditionally belonged to the greatest proponents of open markets. The call for "America first" misunderstands that the US is a major beneficiary of open markets. For example, a study by the Peterson Institute for International Economics shows that the country has achieved significant gains through free trade in recent decades. The study also predicts that American GDP could rise significantly again in the coming years due to the reduction of further barriers. The critique of free trade is therefore not justified and is partly based on misunderstandings and false perceptions.

In order for states to continue enjoying the great advantages of free trade, some of the criticisms must be seriously examined; and it has been too long since such an examination has taken place. The political discussion is sometimes as decisive as it is in the cross-section. Even if a nation benefits from free trade, this does not mean that all of its citizens or all regions also benefit therefrom. This is one of the findings that has regained importance, especially after the partly surprising election exits of 2016 – consider the Brexit referendum and the American presidential election. An important question is therefore how as many citizens as possible can participate in the fruits of free trade. Inclusive growth is one of the commandments of the hour. Equally relevant is the question of how citizens can sustainably benefit from free trade. The resilience aspect is therefore equally important.

Secondly, the advantages of open markets as described by Ricardo can



only be achieved if they are based on reciprocity. The markets in the European Union, and thus also in Germany, are open to foreign trade partners and investors. Europe also expects the same from other countries. Existing investment restrictions on foreigners, for example through the compulsion to establish joint ventures or the disadvantage of public tenders, must be dismantled. The openness of the markets, or so-called “level playing field” is a gauge of the seriousness and credibility with which governments want to implement free trade. They should be a good example to those who are (still) hesitant.

Thirdly, trade partners and investors are in urgent need of legal certainty in the international exchange of goods, services, and capital. In this respect, freedom of contract is a central component of competitive-ly organized economies. We see this

above all in the protection of intellectual property, which is a premise of sustainable innovation. Academic literature has repeatedly pointed to the great role that a functioning legal system plays in the economic development of a nation. The expansion of the legal dialogue and the strengthening of international corporate governance are indispensable prerequisites for the further development of free trade.

The clear commitment to free trade from heads of state and government at the G20 summit this summer in Germany – evidenced by their rejection of protectionism, their decision to highlight and share more about the benefits of economic globalization, and their reaffirmation of the trade agreements and bodies facilitating free trade – was a needed sign. Such actions are necessary in order to benefit the countries described by Ricardo 200 years ago.

Countries such as Germany have a particular responsibility, perhaps a greater responsibility than ever before, to advocate free trade. But not just for themselves, but for countries and their citizens around the globe. ■

Adapted and updated from an article published in People's Daily on July 11, 2017.

Jörg Rocholl
President,
ESMT Berlin



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ESMT Annual Forum

June 22, 2017





Dieter Zetsche, Chairman of the Board of Management, Daimler
 Carsten Kengeter, Chairman of the Executive Board, Deutsche Börse
 Heinrich Hiesinger, Chairman of the Executive Board, thyssenkrupp

“

In times of transition and disruption, organizations must learn to embrace change and move quickly. Agility is called for today at every level of business and across every industry. Lean management – based upon the principles used in software development and characterized by fewer hierarchies and the ability to respond swiftly – is more relevant than ever before.



Save the Date

Technology. Managing the Future
 ESMT Annual Forum, June 7, 2018

Averting Digital Auto Safety Hazards

Clarification of data ownership and access rights are critical to ensuring future driver safety.

The car of the future will collect a wide range of data. Ownership and usage of those data must be clarified, and legal and technical characteristics have to be established in order to ensure data protection, data security, vehicle safety, and a fair market.

On these issues, DSI has carried out stakeholder workshops with the automotive sector, mobility digital startups, automotive insurers, and vehicle inspectors and, on this basis, has developed the following recommendations.



All providers should be in an equivalent, fair, appropriate, and non-discriminatory position to offer their services to respective data owners.

The right to personal data collected in the vehicle should be first due to the customer (owner or driver, depending on the context). Customers should be transparently informed about the collected types of data and the depth of the data collection to decide how to make the data accessible, to whom, and for what purpose. Data should be bundled into understandable packages based on types and use context. On the other hand, the rights to strictly vehicle-related technical data – in which a person is not directly identifiable,

which are produced by and in technologies of the vehicle, which fulfill essential functional and safety-relevant functions, and which the vehicle manufacturers or associated original equipment manufacturers (OEMs) are most capable to understand and process – should be given to the vehicle manufacturers or the OEMs first, in order to achieve a clear and effective distribution.

In order to enable a large and fair market as well as the broad development of the automotive and mobility market, all service providers and third-party providers should be in an equivalent, fair, appropriate, and non-discriminatory position to offer their services to respective data owners. This is the only way to ensure a high level of innovation in the automotive and mobility sectors. When using the data, service providers and other third-party providers must ensure their security and data protection in accordance with applicable national law. Decisions regarding the wishes of service providers or third parties for special access to data or specific surveys of data to enable new business models should be made by vehicle manufacturers in order to ensure the safety and integrity of the vehicle's overall architecture. These decisions must be factually justified and independently verifiable. Because of the security implications, it is particularly important that service providers and third parties do not receive “write” access to vehicle systems, except through explicit bilateral agreements with vehicle manufacturers or OEMs for purposes of maintenance and diagnostics in the garage via the on-board diagnostics (OBD) interface on the parked vehicle. Third-party software in the vehicle must not have direct access to the controller area network (CAN bus).



For data that is critical for data protection, data security, or vehicle safety, access must be explicitly managed in order to establish responsibility and accountability as well as to ensure a correct implementation of technical standards. A centralized, technical management of the data transmission by OEMs is conceivable for these data types, but the service providers working with these data should not be placed at a disadvantage to the OEMs. An automotive platform could be a different or complementary measure of warranty.

For data types with relevance to auto safety and security, the state should define – in consultation with insurers, inspectors, and law enforcement authorities – whether and in what form these data must be collected and deposited and in what manner and under what conditions access to these data may take place, provided that such data are relevant for accreditation processes, accidents, thefts, manipulations, or similar processes that necessarily involve external parties. For highly automated vehicles (level 3 and above), transparent, cross-manufacturer

standards are required for a set of relevant data to be recorded, for the data formats to be used, and for access to these data. For the implementation of the handling of relevant data in practice, a model of an independent



We must guide technical and regulatory development via principles that address future automotive concepts and architectures.

data trustee can ensure that the raw data is encrypted and treated impartially and that access is only possible with legitimate interest, taking into account legal requirements. Such a model could also be considered for the provision of other personal data.



In order to consistently achieve the desired goals despite technical and legal complexity, it is necessary to guide technical and regulatory development via principles that address future automotive concepts and architectures. After consultation in the stakeholder workshops, DSI proposes the following principles:

1. Privacy by design: The privacy of private data should be made architecturally, not only legally. The underlying technical concept shall be “trustworthiness” not “trust.”

2. Privacy by default: As described, personal or person-generated data should first belong to the driver/owner of the vehicle.

3. Security by design: The security of critical functions should also be secured architecturally and “trustworthy.” The underlying technical concept, whenever possible, should be provable security, not assured security.

4. “Safety First” principle for IT security: If data or informational processes have implications for safety, the risk must be considered high – regardless of the probability of attack – and safety requirements must be met according to this risk expectation.

5. Consistency of safety and security requirements: Standards and assumptions expressing the reliability of safety-functions must be applied in the exact same quantitative expression – “one-to-one” – to the security of the systems carrying these functions.



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Fair upgrades improve profits.

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Companies in many industries (e.g., travel, hospitality, shipping) practice upgrades and upsells as a mechanism for balancing capacity and demand mismatches with the goal of improving revenues. But which customers should be offered an upgrade?

Together with Guillermo Gallego, professor at Hong Kong University of Science and Technology, I investigated optimal upgrade allocation and optimal upsell pricing when customers have different willingness to pay and under various demand scenarios. We find that, in general, it is more profitable for a company to use fair upgrade allocation policies whereby the customers purchasing higher quality products are more likely to be upgraded. This leads not just to higher overall customer satisfaction, but also additional demand for higher quality products.



Catalina Stefanescu-Cuntze

Professor of Management Science, Deutsche Post DHL Chair,
and Dean of Faculty, ESMT Berlin

Our Commitment to Europe

A declaration for peace, freedom, and prosperity from the #We4Europe initiative

European industry and millions of its employees have benefitted for over half a century from peace, freedom, and economic co-operation. It is the basis of our economic prosperity and quality of life. And that foundation must not be jeopardized. This is why we, as internationally operating companies, are declaring our common commitment – to an open, united and strong Europe!

The European Economic Community (EEC), a milestone in the economic and political cohesion of Europe, was founded 60 years ago, at a time when the rubble of two devastating world wars had not been completely removed and our continent bore all the scars of war and suffering. The Europe in which we now live is a different, better Europe.

As the largest internal market in the world, Europe is a heavyweight in international trade. The per capita GDP of the six founding nations of the EEC has since tripled in size. We have a degree of personal prosperity and freedom that was unimaginable directly after the end of the Second World War.

As internationally operating companies, we are all agreed that Europe gives us many benefits and now is the right moment for us to give something back.

From the outset, political and economic integration were mutually supportive growth drivers. The common market was just the starting point of an increasingly interwoven European world: goods and services are freely traded today, and every

day the old borders and language barriers are disregarded as a matter of course. It is where people meet. It is the lifeblood of Europe. While it needs to be discussed which topics the EU should address itself and which it should leave to the member states, we should return to a focus on the benefits of the union instead of constantly complaining about red tape and regulation.

Yet these benefits of European integration are often seen as the norm. The fact that they only emerged as the result of enormous effort is sometimes overlooked or forgotten. But we in our companies experience the many benefits of Europe on a day-to-day basis. Our everyday life and working world is an international one. And we want to draw attention to that.

We are committed to supporting the future of Europe, which is why this issue is and will remain important for our communication agenda.

We support all areas of society actively and constructively lobbying for European unity. And we want to encourage those responsible in government, industry, and society to continue strengthening the cause of a united Europe and work together on making it better. As internationally operating companies, we want to play our part in this.

For peace, freedom, and prosperity – for a united Europe! ■

In September, ESMT Berlin joined the economic initiative #We4Europe to show support for a unified and open Europe.

Launched on the anniversary of the founding of the Council of Europe (May 5, 2017), the initiative emphasizes the advantages of European integration, celebrates its diversity, and stands against protectionism.

The founding companies and partners of #We4Europe include renowned companies such as BMW, Deutsche Börse, innogy SE, and thyssenkrupp.

Campus Life

Guest Speaker Highlights ESMT Berlin in 2017



Jürgen Fitschen, Chairman,
Deutsche Bank Foundation



Alexander Doll,
CEO, Barclays,
Germany



His Excellency
Mr. Ali Kemal Aydin,
Ambassador of
Turkey to Germany



Bernhard Mattes,
Supervisory Board,
Ford Germany

Dr. Rheinhard Zinkann,
Executive Director and
Co-proprietor, Miele



Béatrice Guillaume-Grabisch,
CEO, Nestlé Germany

“

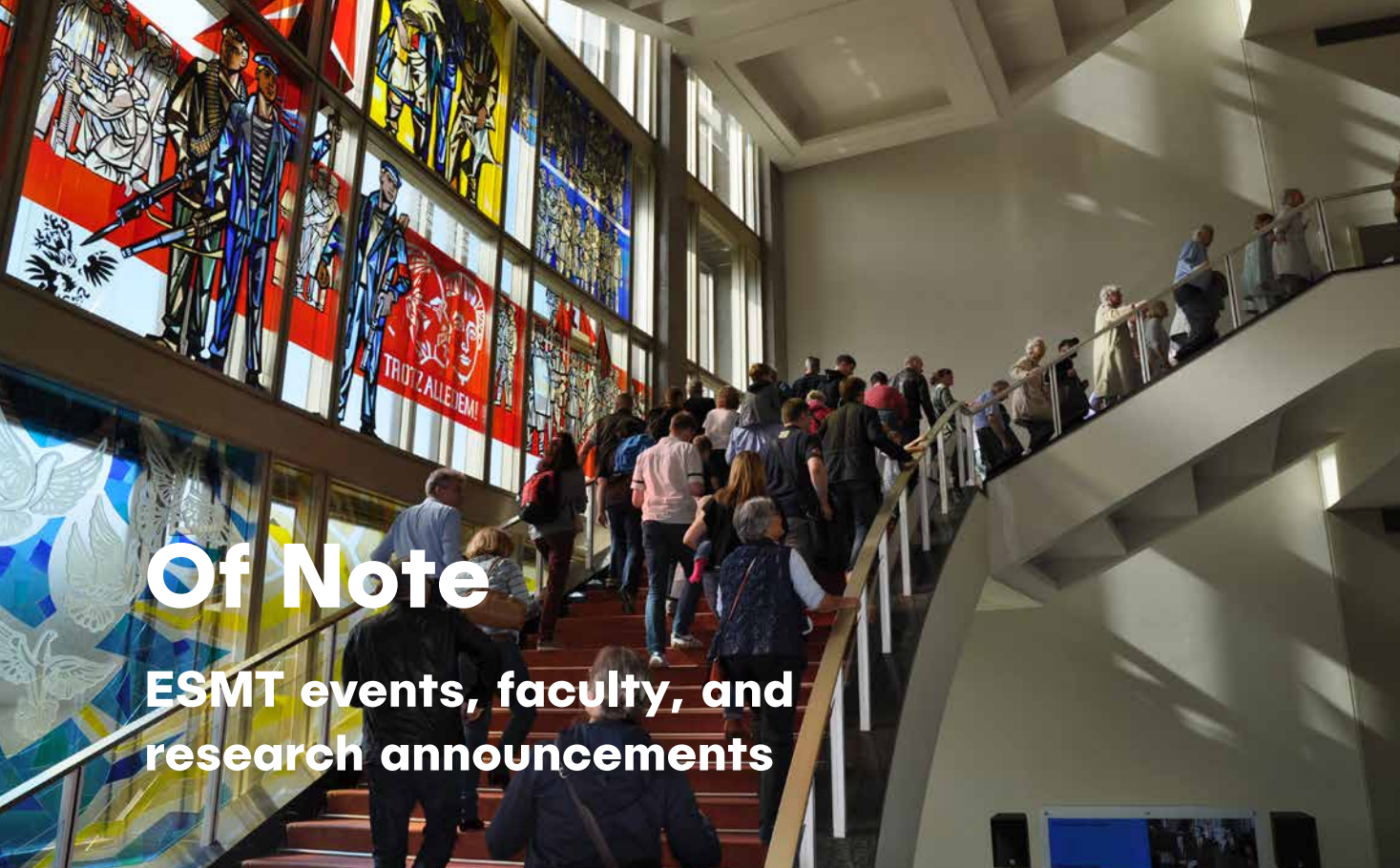
ESMT Berlin boasts one of the most diverse faculties in Germany and students are enrolled from around the world. This commitment to internationality is also well represented in the invited guests with whom students have a chance to discuss business development, strategy, and leadership with a global focus.

His Excellency
Mr. Gurjit Singh, Ambassador
of India to Germany



Dr. Christoph Franz,
Chairman, Roche





Of Note

ESMT events, faculty, and research announcements

Tour of ESMT Berlin as part of European Heritage Days, September 10, 2017.
Photo by Walter Womacka.

First institute for hidden champions opens doors

The Hidden Champions Institute (HCI), which opened on November 22, brings together practical research, executive education, and discourse between academia, society, and hidden champions, companies that are in the global top three and the market leader on their continent and have a turnover of fewer than five billion euros. These companies are often not well known, but they are strong innovators. The German economist Sabine B. Rau is the founding director of the newly established institute, the first of its kind worldwide. Johannes Habel has been named academic director; Bianca Schmitz is managing director. (November 22) ■

ESMT opens branch office in China

With the opening of a branch office in Shanghai, China, ESMT will expand its executive education programs in Asia and provide a platform for dialogue and communication on urgent business issues in Asia and Europe. ESMT will support companies in China and Germany to learn from each other in order to advance business activities around the world. ESMT's expertizes in technology management, leadership, European competitiveness, and doing business in Germany provide an important foundation. (October 27) ■

Cooperation with SKOLKOVO business school begins

ESMT Berlin and the Moscow School of Management SKOLKOVO have signed a memorandum of understanding to cooperate more closely in business education. The schools will thus promote academic exchange between German and Russian organizations. (October 17) ■

ESMT joins #We4Europe initiative

In September, ESMT joined the economic initiative #We4Europe to show support for a unified and open Europe. The initiative emphasizes the advantages of European integration, celebrates its diversity, and stands against protectionism. The founding companies and renowned partners of the #We4Europe include BMW, Deutsche Börse, and thyssenkrupp. Peter Terium, who is a member of the ESMT Board of Trustees and the CEO of innogy SE, spearheaded the initiative. For more information, follow #We4Europe on social media. (September 19) ■

School welcomes diverse new classes

In September, ESMT welcomed 89 students from 39 different countries to the newest Master's in Management (MIM) program, almost doubling the class size. Forty-three percent of the students are female; the aver-

age age is 23. The ESMT MIM is ranked 14th globally by *The Economist*. The latest Executive MBA class also started on campus in September with 64 participants. The program is ranked 31st in the *Financial Times* global ranking of Executive MBA programs 2017 and is first internationally for career progress for the sixth consecutive year. (September 18 and October 9) ■

Industry Immersion Program in Africa begins

Thirty graduates from ten African countries started the first academic module of the Industry Immersion Program (IIP) in Cape Town, South Africa at the beginning of July. Launched in cooperation with the African Institute of Mathematical Sciences (AIMS), the IIP is a six-month program that prepares mathematically and technically trained students to transition from academia to industry. It includes two academic modules as well as a 12-week internship with industry partners across Africa. The class graduated on December 1, 2017. (July 7) ■

Students organize DigitalFuture Summit

The one-day summit, held in June at ESMT, was organized by Master's in Management students to focus on the chances and challenges of digitalization for the next generation of entrepreneurs. The summit brought together more than 300 international students to directly engage with leading companies via keynote presentations, panel discussions, master classes, and workshops. Featured speakers included Rocket Internet COO Johannes Bruder, DaWanda CEO Claudia Helming, Allianz COO Christof Mascher, and Head of DigitalLife@Daimler Markus Hägele among representatives of 29 companies. (June 23) ■

ESMT Annual Forum 2017 addresses business agility

More than 400 international experts, decision makers, and academics attended this year's forum in June. Presentations addressed topics such as agility in industry and organizations, changing assumptions on management best practices, the positive and negative perceptions of innovation, strategies in workforce management and incentivization, and new leadership skills development within the Digital Age. The next ESMT Annual

Forum "Technology. Managing the Future" is scheduled for June 7, 2018. (June 22) ■

President and CFO sign on for five more years

In a unanimous decision, the supervisory board of ESMT Berlin has extended the contracts of Prof. Jörg Rocholl, president, and Georg Garlichs, CFO. During their tenure, ESMT has reached many impressive milestones, including the right to award PhDs, the opening of two centers and institutes, the launch of the international Master's in Management program, and earning the "Triple Crown" of international business school accreditations: AACSB, AMBA, and EQUIS. Prof. Rocholl has researched and taught at ESMT since 2007 and was appointed president of ESMT in 2011. Before joining ESMT in 2014, Georg Garlichs was chancellor/CFO of EBS University in Wiesbaden/Oestrich-Winkel. (June 4) ■

Reading Room

Selected reading from published ESMT research

Contracts as a barrier to entry in markets with non-pivotal buyers

Özlem Bedre-Defolie, Gary Biglaiser
American Economic Review 107(7): 2041–2071

Naivete-based discrimination

Paul Heidhues, Botond Köszegi
The Quarterly Journal of Economics 132(2): 1019–1054

Risky recombinations: Institutional gatekeeping in the innovation process

John-Paul Ferguson, Gianluca Carnabuci
Organization Science 28(1): 133–151

From products to solutions: Mastering sales force incentives

Johannes Habel, Olaf Plötner
European Business Review 2017 (September–October): 33–35

The declining interest in an academic career

Michael Roach, Henry Sauermann
PLOS ONE 12(9)



ESMT SCHOLARSHIPS FOR WOMEN IN LEADERSHIP POSITIONS

Scholarships are available for the IT Leadership program, the Executive Transition Program, the General Management Seminar and the program Bringing Technology to Market.

ESMT scholarships have been established to encourage and support outstanding women who have demonstrated excellent management and leadership potential required in a general management position.



**Executive Education
Ranking 2017**

8th worldwide in executive education and
number one in Germany *The Financial Times* 2017

www.esmt.org/esmt-womens-scholarship



A portrait of Klaus Biehl, a middle-aged man with glasses, wearing a dark suit and a white shirt. He is smiling slightly and looking towards the camera. The background is a blurred indoor setting with large windows and columns.

In Profile

Conversations with alumni of ESMT Berlin

Klaus Biehl

In this edition, Junior Alumni Relations Manager Franziska Neugebauer speaks with Klaus Biehl, who talks about his role at Siemens Power and Gas as well as his insights on the tremendous effects of digitalization on the energy sector.

Tell us about yourself and your role at Siemens.

My name is Klaus Biehl and I come from the vicinity of Cologne, where I grew up and also went to university (business degree, University of Cologne). Before joining Siemens in 2005, I was working as a management consultant at Roland Berger Strategy Consultants in Düsseldorf. My first job at Siemens was at Siemens Management Consulting (SMC), where I had the chance to work in projects in almost all Siemens businesses and corporate functions. After SMC I held a variety of positions such as head of strategy and marketing for Siemens' Industrial Gearbox business and COO of a then newly founded internal process and production consultancy. At Siemens, I particularly like the variety of industries that we

cover as well as the opportunity to work for a truly global company.

Today I work as head of strategic planning and projects of the Power and Gas Division. The energy sector is inevitable for any society and a prerequisite for any sustainable demographic and economic development. Currently, the sector is in the middle of a radical transformation, with, for example, renewables and decarbonization changing the entire market dynamics for our customers and us.

What would you say most motivated you to take part in the Executive Transition Program (ETP) at ESMT? How did it later affect your work at Siemens?

At the time I started with the ETP in 2011, I was head of strategy and marketing and had

worked in consulting and strategy positions my entire career. My goals were to broaden my perspective and to prepare for new tasks. There are at least four aspects of the ETP that were especially interesting for me:

1. The ETP is specifically designed to support the development from functional towards general management roles.
2. The content covers a wide range of topics and exciting teaching methods, for example, discussing leadership based on the example of a classical orchestra, and experiencing crisis communication in a case study with the head of communications of a DAX company.
3. My classmates have been great to work with. It was a very heterogeneous group of people, coming from different countries, industries, and professional backgrounds. Bringing together all these different experiences and opinions in discussions helped me to broaden my perspective on how things can be done.
4. Last but not least, going back to university with 10 years of professional experience allowed for a totally new understanding of topics such as leadership and transformation.



We cannot simply copy and paste their innovations. We need to pioneer our own way to Industry 4.0.

Could I have achieved the same career steps without the ETP? Yes, but the program was really inspirational, broadening my horizon and helping me grow personally and professionally.

How would you describe the effects of digitalization on Siemens' manufacturing? How does it show in your everyday work?

Today it goes without saying that digitalization is intersecting with all industries and challenges the status quo in a variety of mar-

kets, yet, at different paces. In the rather traditional energy world, we witness that digitalization is getting real traction beyond "cheap talk." For my business unit, being a traditional technology leader in power generation, this has tremendous effects: First, it changes the business models of our customers as well as our own business models. In the future, it is not only the OEM's technology that makes the key difference, but rather the application of smart algorithms to customers' data that can deliver decisive selling propositions. For example, now customers are increasingly demanding outcomes, such as "power by the hour" and availability, rather than merely products or solutions.

Second, digitalization also changes how we deliver into the market using digital representations of the physical world, also known as Industry 4.0. For us, being part of the Siemens family, the good news is that although our work changes every day a bit more, we can utilize our partner division's unique set of digital expertise in the arena of CAD/CAM/PLM and operation optimization. Thus, we have a lot of experts and tools within Siemens that help us to navigate through uncertainties and continually challenge our traditional physical products and processes.

Can you name some benefits/challenges of the smart industry in general and in particular for the Siemens Power and Gas Division?

I guess one way to describe the benefit is: Digitalization can make things easier and faster! By managing connectivity, data, and analytics we are able to improve, link, and speed up processes. For example, we achieve impressive delivery time reductions by printing components based on 3D-enhanced end-to-end models.

Yet, it is also true that changing the status quo can be outright scary and difficult for incumbents. The telecommunication industry is a deterring example of how challenging it can be for large multinationals to lead disruptions and transform business models. Similar to the telecommunication market, the energy sector is a traditional infrastructure market with a few players that is characterized by large investments and long planning horizons. Driving transformation, being

flexible and agile, as well as imagining an industry entirely from a new perspective is for sure a challenge for everyone.

Let me also mention manufacturing. So far, mainly industries characterized by individualized mass production (e.g., automotive) have paved the way to Industry 4.0. In our business, we cannot simply copy and paste their innovations but need to pioneer our own way to Industry 4.0, because the engineering and manufacturing environments for small and large turbines, compressors, and generators pose very different challenges.

Looking at developing technologies what do you think is going to be the game changer for industry? Why?

I think that Additive Manufacturing (AM) has the potential to revolutionize the manufacturing industry. AM is a process that builds parts layer-by-layer from sliced CAD models to form solid objects. Recently, we were able to deliver a breakthrough: the first gas turbine blades ever to be produced using AM. This not only enables new ways of manufacturing parts and improves time-to-market, it also allows for new service and partnering models. Imagine if you only need a CAD-model and a printer to produce high-end turbine parts – this might be indeed called a game-changer. But again, it is not one technology alone that drives the revolution. It is a combination of different digital or digital-enabled technologies plus new business models that carry the transformational power.

What can we do to prepare ourselves for changes in the workplace that come with advanced technological development? What role does education play?

That digitalization is changing the nature of existing jobs is meanwhile undisputed. Education in the classical sense maybe does not entirely grasp what is required. I believe paradigms like organizational transformation and life-long learning are more meaningful concepts to adapt to the workplace of tomorrow. What we need are people to think innovative, love disruption, break silos, act agile, be curious, and use prototyping. Education is an important ingredient to spark

this spirit and also help people to get familiar with new tools and methods. For example, getting familiar with lean and agile working modes rather than following waterfall software development processes is an important contribution. Yet, to be fully able to reap the fruits of such models you need to change the entire organization and its entire working and leadership culture. What we experience is that we need to take new approaches for our top and middle management so that they can experience the “vibes” of change and disruption. This is why we also conduct “expeditions” to engage with external partners, startups, thought leaders, and more.

What are the goals you most want to accomplish in your work?

As mentioned before, the energy sector is undergoing a radical transformation. As part of the strategy team, I have the aspiration to support the Power and Gas Division to successfully manage this transformation and to successfully position Siemens in the energy sector of the future.

As a leader, I strive to develop my team and myself every day. Today’s work environment requires new work and leadership models. Personally, I am learning lean and agile approaches and also implementing them in my work environment. Siemens supports this through training and practitioner/expert communities.

Tell us about your role in the ESMT alumni community.

Within the ESMT alumni community, I currently engage in three kinds of activities. I am a member of the Munich alumni chapter. It is a very interesting and active group of people and, events include company visits, discussion of startup ideas, and social events, such as our annual Christmas dinner. Secondly, I am a member of the Strategic Advisory Group. This group supports the presidents of the Alumni Council on setting and executing the agenda of ESMT’s alumni network. In addition, I am supporting ESMT as a lecturer. In a number of ESMT visits to Siemens, I held lectures on our business excellence approach. ■

Alumni at Large

A roundup of news and events from and for ESMT Berlin alumni

There's an app for that!

With more than 18,000 alumni of ESMT degree and executive education programs in the network, it is definitely time for alumni to have a mobile resource. The new alumni app is available on Apple iOS and Google Android platforms. Simply search for "ESMT." (Prefer analog contact? Then be sure to attend the **next Alumni Network Annual Meeting on June 8, 2018**, the day after the ESMT Annual Forum.) ■

ESMT Alumni give scholarship to youth advocate

Since 2012, the ESMT alumni community has raised funds for the **Alumni Network Fellowship**, a scholarship given to an incoming MBA or EMBA student from the non-profit sector, who plans to return to non-profit work after graduation. Donations cover half the student's tuition; ESMT Berlin covers the other half, amounting to a full scholarship. This year's Alumni Network Fellowship scholarship recipient is **Marina Mansilla Hermann**. Marina is the founder of Fundación TierraVida, an organization based in Argentina working to unleash young people's potential to drive environmental sustainability. She also currently works as the children and youth senior change manager at Ashoka Europe, which she joined after working for more than a decade in other international children and youth organizations. ■

Outstanding graduates honored at Annual Meeting

At this year's **Alumni Network Annual Meeting** in June, the 2017 President's Award for Alumni Service was given to **Daria Markova** and **Niels Madsen**. They have been

active members of the ESMT alumni community since successfully completing their MBAs in 2014. With great entrepreneurial spirit and willingness to take risks, they created Berlin's greatest co-working space, Space Shack, which supports ESMT students and other alumni. The 2017 President's Award for ESMT Alumni Leadership Achievement was given to **Alexander Kudlich**. Since his time at ESMT as a member of the Executive MBA class of 2008-2010, Alexander achieved great career success at Rocket Internet, first as group managing director and currently as a member of its managing board. ■

Frankfurt Chapter tours former stock exchange, attends briefing

In July, the Frankfurt Chapter enjoyed a private tour at the Alte Börse. Special thanks go to **Oliver Engels** (MBA 2006) for making it possible to visit the trading floor and to hold a meeting thereafter in one of the Börse meeting rooms to discuss topics that included regulation and disruptive technologies. In September, the chapter met at the Deutsche Bank Tower for an expert briefing by ESMT Professor **Joe Peppard** titled "What Every Business Leader Should Know and Do about IT in a Digital World." ESMT Berlin organized the briefing in collaboration with the American

Chamber of Commerce in Germany; **Karl von Rohr**, a member of the Management Board of Deutsche Bank AG and a member of the ESMT Berlin Supervisory Board, opened the meeting. ■

Business leaders visit Berlin campus

ESMT Clubs are jointly organized and hosted by current students and alumni. In August, the Investment Club enjoyed a presentation on cryptocurrency by **Christoph Burger**, senior lecturer and senior associate dean of executive education at ESMT. The Entrepreneurship Club invited speakers in the early fall, including **Lars Hinrichs**, founder of XING; **Magnus Graf Lambsdorff**, partner at Lakestar; and **Tristan Rouillard** (MBA 2015), venture development manager at WATTX. ■

Upcoming webinars offered to alumni

The ESMT Alumni Webinar Series covers a range of topics in one-hour afternoon sessions, featuring school faculty on their respective areas of expertise. Participants may submit questions at registration or during the webinar. All sessions are recorded for distribution in the network.

- Nov 9, 2017: Customer Recovery Strategies with **Benjamin Quaiser**, Program Director of Executive Education
- Feb 1, 2018: Implementing European Cybersecurity Regulation with **Martin Schallbruch**, Deputy Director and Senior Researcher of Cyber Innovation and Cyber Regulation, Digital Society Institute (DSI)
- Mar 29, 2018: New Trends in Sales Force Incentivization with **Johannes Habel**, Associate Professor and Program Director ■



Frankfurt Chapter at Deutsche Börse

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