Head or heart? Both!

Many investors make (supposedly) rational decisions – and repeat past mistakes. So it’s about time you don’t ignore your gut feel, but also remember trust, but verify.

Role Model Norway’s state fund shows how to invest wisely
Change How Bilfinger is adapting to industry service developments
Dear Reader,

Investing is one of the more sophisticated forms of gambling. Just as most gamblers only remember their wins, companies engaged in regular capital expenditure like to focus on grand programs and big returns. Whether it is for external PR, the benefit of the Investment Community, or just for internal communication, few would choose to focus on their losses or highlight aspects of their capex program which might have produced a better return. Yet, if truth be told, for every A-grade successful project there are quite likely to be a number of investments which would only merit a D or maybe a C grade. For every external factor of chance governing success, there are at least as many internal aspects which can and should be controlled more closely.

A surprising number of people and processes in large companies, especially, seem unfazed or even numb to the value of millions and even billions of dollars they handle. At the very least, they might not realize the power and duty they have to minimize risk and maximize returns. Playing with other people’s money is relatively risk-free, but in reality it’s very rarely other people’s money. It has been hard-earned and belongs to all the stakeholders.

The considerations and decision-making mechanisms are mostly no different to those which would be used by honest folk looking after, say, their own household budget and managing a modest retirement portfolio. Of course there are sophisticated tools and even AI techniques which can be deployed, but even global industrial-scale capex management should be based on clarity of purpose, rigorous analysis of detail, and careful adherence to tried-and-tested processes.

In this edition of INSITE we bring you stories of investment success and failure and try to learn from the experience. We indicate what we consider good investment practice and also highlight how companies, organizations, and savvy investors in a number of different sectors deal with the challenges they face and go about their business in a considered and careful manner. In this digital age it would still seem that “if it sounds too good to be true, it probably is” and “if you watch the pennies, the pounds will look after themselves.”
FOCUS: INVESTING

8 BIGGER PICTURE • History Repeats Itself
Investors have been making the same mistakes for centuries. But what can you do to avoid your predecessors’ mistakes?

12 COVER STORY • Big Investment, Low returns?
Many projects fall behind schedule and exceed their budgets. Dirk Frame shares nine principles that can help make investments perform better.

20 INTERVIEW • The Team Is More Important Than the Business Idea
Florian Heinemann discusses the opportunities and risks of venture capital investing in innovative start-ups.

24 A CASE IN POINT • Learning from Norway
Paragon of excellence: why the Norwegian sovereign wealth fund is a prime example of a successful investment strategy.

28 INFOGRAPHIC • Megaprojects: Milestones or Bottomless Pit?
A selection of infrastructure projects that planners had seriously misjudged.

30 EXPERT INTERVIEW • More Technology, Closer Connection
Gerhard Pilotto talks about the new requirements facing industry service providers and the effects of digitization on Bilfinger.

34 INDUSTRY FOCUS • Robot Revolution
New robotic applications are driving predictive maintenance. INSITE takes a look at five applications with potential.

38 INTERVIEW • Investing in Expertise
Maren Stieeler discusses the retention and recruiting strategies employed by T.A. Cook to counteract a lack of specialists.

42 PROFILE • One Woman, Two Worlds
How Katja Neuthe bridges the gap between traditional science and modern consulting.

44 AWARDS • 20 Years of Maintenance Innovation
T.A. Cook has been recognizing companies with innovative ideas since 1999. INSITE presents current and past award winners.
In a Nutshell

“You have to throw money out the window, so it can come back in through the front door.”

When Karl Lagerfeld said this in a 2008 interview with Die Zeit, the conversation had nothing to do with his extravagant lifestyle. Instead, Lagerfeld was talking about the financial crisis that had unfolded a few months prior, and its impact on his work. He believed that money needs to circulate, which doesn’t exactly work through the front door.

Recommended Reading

No One Is Perfect

Daniel Kahneman: Thinking, Fast and Slow

Homo economicus was undisputed for quite some time. The theory’s core statement: economic decisions are made entirely rationally with the aim of ensuring maximum benefit. Nobel laureate in Economics Daniel Kahneman is one of the sharpest critics of the model, sharing his opinion in his book Thinking, Fast and Slow: Investment decisions made without opinions or feelings, are if by robots! For him, pure fantasy.

The psychologist examines human behavior very carefully. How do we make decisions? What goes on in the brain? How do things and people influence our thinking? Kahneman analyzes these questions using practical examples and verifies his ideas with experiments and statistics. Kahneman ultimately comes to a clear conclusion: no one behaves entirely rationally. Bad decisions are a part of everyday (business) life. For him, that’s no reason to despair: Kahneman provides plenty of examples of how we can improve our judgment with small tricks. After all, the more experience you have, the less likely investments will fail.

Recommended Listening: Podcasts

The Economist

Once a week, employees of the renowned weekly newspaper The Economist discuss politics and business, generally examining background information on especially relevant and current topics and thus providing additional information and perspectives. Unlike the other formats already introduced, The Economist podcast requires a paid subscription.

BBC Radio 4

If you’re interested in background stories on a whole host of topics, BBC Radio 4 is the right choice for you. From Brexit to business analysis in “The Bottom Line,” there’s a background story inspired by current events for just about every area of interest. An insider tip: the nine-part series “Letter from America” by former BBC correspondent Alistair Cook takes a closer look at social developments during the terms of office of past US presidents.

Robohub

Robohub offers plenty of material for amateur and professional technophiles alike. In this nonprofit podcast, experts from the fields of science, research, industry, and finance share their knowledge with listeners. But if you’re interested in listening to this podcast, you should know your way around robotics. While the podcast makers try to make the interviews accessible to as wide an audience as possible, for the most part Robohub is considered to be a format for experts. Many of the conversations are extremely technical and detailed. If that doesn’t scare you off, this podcast is definitely worth a listen.

BBC Radio 4

National Public Radio (NPR): Planet Money

“The economy explained” – that’s the principle of the Planet Money podcast. And it delivers on its promise: this is the right format for anyone who’s interested in financial matters. The podcast makers address financial and money-related issues of all kinds in each of the episodes, with over 900 episodes produced so far.

* Source: The Gartner 5G use case and adoption survey was carried out by members of the Gartner Research Circle and others between May and June 2018. The aim was to help Gartner understand the growing demand and plans to introduce 5G. 185 members participated; IRS Research Circle members and 100 external respondents.
History Repeats Itself

Many investments fail due to a small but often overlooked factor: mankind’s irrationality. The concept of the passionless, faultless Homo economicus who unemotionally calculates everything to his benefit belongs in the economics scrap heap. If you have any hope of avoiding the mistakes of past investors, you need to be able to acknowledge the shortcomings of your species.

For his sake, you can only hope that John McAfee doesn’t lose his bet. With a penchant for flashiness, the founder of the antivirus software company of the same name announced on Twitter that he would eat his own genitals if the exchange rate of the cryptocurrency Bitcoin didn’t climb to US$500,000. “It’s mathematically impossible for me to lose this bet,” says McAfee with confidence. There’s not much time left until he has the dubious pleasure of paying off his debt. After massive foreign exchange losses, the Bitcoin currency is now not only light years away from the US$500,000 mark, but also its maximum price of just under US$20,000 in December 2017. This all-time high was the culmination of a sudden and fast-paced rally with an increase of around 1,600 percent within just eight months.

But anyone who rises as quickly as Bitcoin runs the risk of falling just as fast and far. That’s how life is, that’s how the stock market is, and that’s how it has always been. Regardless of whether it’s real values, real estate derivatives, futures contracts, or high-tech cryptocurrencies such as Bitcoin. Markets have a life of their own and, despite state-of-the-art technology, are never 100% predictable by any means. “The future is in large measure uncertain, so our assessments of companies’ future profitability are bound to vary,” writes Niall Ferguson in his largest work, The Ascent of Money: A Financial History of the World. The British economic historian and Harvard University lecturer can only sneer at the thought of Homo economicus, which was long considered to be the holy grail of economics: “If we were all calculating machines, we would simultaneously process all the available information and come to the same conclusion. But we are human beings, and as such are prone to myopia and to mood swings. When stock market prices surge upwards in sync, as they often do, it is as if investors are gripped by a kind of collective euphoria: what the former chairman of the Federal Reserve Alan Greenspan memorably called irrational exuberance.”

Greenspan himself and his successors at the head of the US Federal Reserve System or the European Central Bank have borne a majority of the responsibility for the fact that both investors and business leaders act like a bunch of sheep in the first place – and embrace their “animal spirits” as bulls or bears. A look at more recent history in particular reveals that one of the principal ingredients of an investment bubble is the central bank’s extremely lax credit policy. If money is less expensive than ever before and negative interest rates are currently applied to savings, that drives investors to ever-riskier business – and companies to increasingly reckless financing schemes or dubious investments. The rise and sudden fall of Bitcoin is the most recent example.

A new technology, the belief that “this time everything will be different,” lots of imagination, and cheap money in the form of low interest rates – this is the simple, yet diabolical mix required for a speculative bubble.

The history of major flops goes back centuries. Considered to be the “Mother of all bubbles,” the speculation with tulip bulbs in Holland began in 1634 and burst on February 7, 1637, with a substantial drop in price. Around a century later, in 1720, any hopes that investors had for their shares in the French Mississippi Company were suddenly dashed. Same year, a
different location, a different colonial power: the South Sea bubble burst and with it the unrealistic hopes of investors in the British South Sea company. Tulip bulbs, Mississippi Delta, or the even farther-afield South Sea: these three historical examples all have one thing in common: hype for an investment that failed.

Particularly when investors are driven by their own greed and herd instinct to enter territory that is unfamiliar to them, the risk of loss is immense. Economists refer to this as “asymmetrical information”: insiders such as managers at bubble companies always know a whole lot more than outsiders. This insider advantage increases the more specialized the field of investment. Not even cutting-edge technology can fundamentally change anything about that. According to a variety of studies, social media such as Twitter does not represent an objective information channel for investors, but instead intensifies irrational upward or downward fluctuations.

**Hubris as the Beginning of the End**

The Wall Street Crash of 1929, Silver Thursday in the 1970s, and the Japanese asset price bubble in 1990 followed by an eternal recession – the list of speculative bubbles goes on and on. Especially the years after 2000 will forever go down in economic history as the period of momentous crises: the accelerated climb of the dot-com stocks on the Nasdaq stock market and on - who remembers anymore? - the new market in Frankfurt was followed by a collapse like no other: within just a few years, most of the stock market prices had collapsed by 90 percent or more. A majority of the companies have never recovered, filed for bankruptcy, or were swallowed up by competitors at bargain prices.

The last major bombshell, at least for the time being, was in 2007 and the world is still holding its breath to this day: the United States housing bubble burst - and with it the almost delusional belief that the financial industry would be able to create a safe world by handing out loans to anyone and everyone in the form of financial products that not even specialists could make sense of. But zero probability of default does not exist – not on stock markets, not in day-to-day business. Every prospect of return faces the same level of risk, as difficult as it may be to see or predict.

The next bubble is on the horizon. That much is certain. The world has become a global marketplace, intensifying interdependencies around the globe. These days, both hype and bubbles not only spread much more quickly than local crises in the 17th and 18th centuries, but also have a global impact. And there’s no sure way to ensure you don’t end up one of the losers. Except for one: common sense. Over the centuries, those who think they’re smarter than the rest have always been the ones who lose after a stock market crash. But this greater fool theory, which has even established itself in the refined academic field of economics, only works provided there’s someone who is dumber, naiver, or more eager to take a risk than you. If no one else is interested in purchasing Bitcoins, stocks, real estate, or tulip bulbs, the price will cease to rise – and the pendulum will promptly swing in the other direction. That’s how the everlasting game of supply and demand works, and it can only be suspended temporarily by hype.
Big Investment, Low Returns?

It’s a problem that many organizations face and considerable effort is often expended on finding out what has already gone wrong. T.A. Cook partner Dirk Frame has been involved in industrial investment decision-making globally for over 30 years across a number of sectors and sees many opportunities for companies to break out of the pattern and make significant improvements. His advice: even if you think you’re following a good process, the devil’s in the detail - take the time to look at things with the right people and do so in detail. The following principles will help get you started.

TEXT DIRK FRAME

The typical investment and capex approach centers on the adoption of an investment process and associated good project management practice. The expectations are high, yet the outcome is so often late and over budget. Whether or not the objectives, let alone specific financial targets, are met is often not even clear.

Sometimes historic trends and cycles will not be a good predictor of the future and, in any case, we would argue that geopolitical events, environmental trends, and consumer movements are causing more uncertainty and faster changes than has been the norm since the mid 20th century. Organisations that are flexible and successful in predicting (or manipulating) trends have an advantage. Those that are confident enough in their process to be able to free up money earlier in a cycle can also expect that their investments will bear fruit faster and, critically, for longer. It is particularly important, therefore, that the earlier stages or gates of a capex process operate cleanly and efficiently, which places greater demands on the quality of information needed for sharper decision-making.

Differences can also be attributed to size, culture, and sometimes the geographic provenance and these aspects are, to a great extent, driven by external factors and are less easily impacted. Additionally, whether a company is government funded, subsidized by a rich parent organization, in start-up or end-of life phase, privately owned or listed tends to change expectations on speed and certainty of return. Clearly, a nationalized strategic flagship corporation might have easier access to capital and a longer-term outlook than a failing business which is in need of a shake-up, but properly categorizing potential projects and prioritizing them against a set of conditions and assumptions is a critical requirement for any setup. Accepting that these differences exist, this article focuses on universal factors which can be influenced within any business or organization. We have therefore highlighted common situations which are often managed poorly and show how the carefully improved rigorously following these good prac-

1: JUSTIFICATION

Fallacy: ROI by some tough definition is enough.

Reality: Pet and vanity projects are rife and spreadsheet business cases are too easy to manipulate.

If you’ve only got time to focus on one thing, start here. Many projects are just not going to deliver what they are supposed to. This is because people have a natural tendency to overestimate capabilities and an unrealistic view of the time and resources to get to a goal.

Conversely, if everyone is risk-adverse and fear of failure drives a portfolio to low-return certainty then an organization can miss out on big wins. The possibility of embarrassment, admonishment, or, worst case, the end to a promising career will certainly put people off even trying for unusual and high-risk options. It is therefore not just a case of only accepting surefire things, it is a case of understanding the specific risks, rewards, and required outlays to achieve those returns and creating an environment in which trying will be supported and rewarded.

The default should be to improve without capital investment and assuming that pet and train-wreck projects have been eliminated, then one of the harder jobs is to create a balanced portfolio. Comparing projects and justifying across a portfolio is certainly...
tricky, but it is made even harder if the projects within a single category cannot even be transparently compared and ranked among themselves. When everything is a priority nothing is, so carefully allocating transparent “seed capital” to qualified project ideas makes performance requirements and understanding easier. Setting both performance requirements and scope is essential, but it is made even harder if performance requirements and scope are vague. The risks identified at the outset may be different to those highlighted later in the project and for this reason the risk register should be a live, dynamic document which is started at the beginning of the project and constantly reevaluated.

Many projects have already failed at this stage because performance requirements are vague and the resultant scope is subsequently a desperate and never-ending catch-up exercise. Hoping that technological advance will step in to over-deliver and it requires time to do this adequately. Taking risks is risky. This is similar to the dangers of taking a chance with a promising GPS short-cut when you’re not driving a decent 4x4 and, to boot, haven’t practiced driving it... in the rain, at night, and might be driving when you’re in a hurry: it can be tempting but also dangerous of taking a chance with a promising GPS short-cut when you’re not driving a decent 4x4 and, to boot, haven’t practiced doing it... in the rain, at night, and might be driving when you’re in a hurry: it can be tempting but also dangerous.

3: RISK MANAGEMENT

Fallacy: All the risks have been identified.

Reality: Yes, people do identify risks, but mostly ones they know, too late and without adequate mitigation.

In areas of scope uncertainty insufficient effort is normally spent identifying what Donald Rumsfeld defined as “unknown unknowns.” At the time, his comment in relation to the Iraq conflict was treated with disdain by many, but the category and its importance is not to be underestimated. We would argue that many aspects of poor performance which are frequently cited by staff as discovery of changed scope or a failure to anticipate and therefore mitigate much of this risk.

Sufficient effort should always be focused on predicting risks and outcomes with greater certainty than that would be a good use of resources. It is worth talking of risks and contingency. As covered in point 7: Resourcing, this means having the right people. Not having someone from sales, supply chain, finance, and so forth on a team can mean that the major risk is just not identified, let alone understood. This is not just a matter of training and blaming the engineers themselves or their education. It is equally unlikely that lawyers, procurement leads, and HR specialists would appreciate everything and/or that an electronics engineer will identify critical pressure flows in a turbine. The second issue is that while risks are sometimes well identified, the mitigating actions are often not so clear and, if they are, the associated accountability and timescales are vague. The risks identified at the outset may be different to those highlighted later in the project and for this reason the risk register should be a live, dynamic document which is started at the beginning of the project and constantly reevaluated.

4: ESTIMATING & COSTING

Fallacy: Once project costs are fixed they shouldn’t change.

Reality: Many projects are woefully budgeted, padded, or ignorant of realities. A barefoot 10% contingency is plain lazy thinking.

Budgeting sometimes starts with an declaration, by someone, somewhere that the project will be done for £Xm. Finding out who said that, promised it, or even remembering when it was said can be a raffle embarrassing when some time later the number is re-committed in a budget and it is looking increasingly like it’s going to be a stretch. Of course, sometimes there are overwhelming reasons why an organization decides to take advantage of a once-in-a-lifetime opportunity and the means-to-an-end can be rationalized. But, really, such occasions are exactly that: quite infrequent. For the most part the budget should be a rock-solid reflection of the effort needed to reach the required deliverables. Relying on historic performance is an indicator or starting point, but efforts should be made to understand the parameters, performance or productivity, and motivation of all concerned. Ignoring the relative merits of the different contract types, fresh eyes should look at the phases and define the value for money. The more that projects can be demystified and deconstructed into modular defined elements the easier this is. Aspects which are genuinely new or complex are then better defined, isolated, and investigated in more detail. Typically, uncertainty is dealt with by applying contingency, but it too should reflect the circumstances.
For certain elements it might be, say, 30%. Other times, realistically, contingency should be close to zero.

Now, if a business cannot afford to do something the right way, the best answer is not to do it or at least consider a partial or phased solution. It can be tempting to try and cut corners or imagine that the best answer is not to do it or at least consider a partial or phased solution. For certain elements it might be, say, 30%. Other times, realistically, it is required to successfully accomplish any single project:

A good gated process is managed by clarity of expectations at each milestone with a clear heads-up that something isn’t going to work out fine. This allows for corrective action well before it hits the gate. This allows for corrective action if the wind blows the right way, for quite a long time, everything might work out fine. Mostly, it doesn’t and an extraordinary effort is then expended on carefully deconstructing the history of the budget and finding novel ways of justifying overruns and variances rather than trying to avoid a recurrence.

All you need for a project to be easily accomplished is a standard process – at least in theory. Gated project processes are readily available, broadly the same in function, and have earned widespread acceptance. The idea behind a gate is that it needs to be opened to allow something through and opening requires a key and/or key master in the shape of minimum criteria to be met. There are two problems with this: first, the secret key code was probably once posted on the noticeboard and it’s never been changed. Second, after opening the gate, it needed to be shut again and people are sometimes forgetful.

A good gated process is managed by clarity of expectations at each milestone with a clear heads-up that something isn’t going to work out well before it hits the gate. This allows for corrective action in good time as opposed to a focus on managing the boss’ disappointment. Most managers are well able to deal with quality information and objective judgement demonstrating a negative trend or expected failure if it is accompanied by a robust action plan.

One can see the recurring theme here: it is a mix of tools, techniques, and human characteristics that makes the difference. Software doesn’t overcome these problems although well-thought through KPIs can help. Having too many Key Performance Indicators which aren’t key at all just add to workload, duplicate other information, and add noise. Similarly, KPIs often demonstrate failings, but only in hindsight so best is a combination of relatively few leading and lagging indicators which quantify progression as well as quality and depth of work needed at the relevant stage.

Organizational structures of externals should be defined by client and contract in advance. Hoping that numerous parties will deal with each other and function seamlessly is a big ask if each has its own microstructure and/or paths that are ad-hoc and without accountabilities which are not nailed down for each phase of work. For many activities, overheads are not linear but step functions and these should be broadly defined in advance. Aside from simplifying communication this has the obvious benefit of also reducing cost. One of the biggest issues facing a project manager is knowing when and how to say “no.” Some organizations make this virtually an impossible task by allocating the role to a relatively junior or inexperienced person who will constantly have to fend off requests for changes and delays from more senior colleagues. When everything is a priority, nothing is and nobody takes any notice anymore.

On top of a standard process, there is another component many believe is required to successfully accomplish any single project: some adequately trained personnel. There are many project managers in a particular methodology and training courses are common so in theory a competent project manager finds themselves in a situation where they should be able to predict spend and outcome with high likelihood. Unfortunately, on larger projects especially, this rarely happens.

Even if resources for one project are quantified as a percentage of the total budget, it is no guarantee that with a multitude of projects the overall workload is being accurately measured and resources allocated accordingly. It is clearly difficult and wasteful to reallocate staff too frequently and many competent staff become fearful of what in rugby terms is deemed a “hospital pass”, but the overall impact of project workload should be quantified. When it gets to the point that capacity is, say 110% of that generally considered necessary for good outcomes, it should be flagged and consequences clearly laid out. Generally, peaks are dealt with as a matter of pride and with engineers, especially, having a reputation for not being able to say no, a bow wave of poor quality and bad outcomes starts to build up.

Best practice structures, formats, meetings, and responsibilities can be easily replicated and clearly not every project needs a massive multiskilled team, but an appropriate analysis of the subject matter at the outset is normally all it takes to make a sound judgement. Having the right team for a given project shortens the time to make decisions and radically reduces the risk of failure. Further, it is quite possible that after an initial assessment their participation can be reduced or at least sensibly tailored to the phases, but their involvement is invaluable.
8: EXECUTION

**Fallacy:** Using an experienced contractor will be enough to ensure the project is successful.

**Reality:** You can’t make a silk purse out of a sow’s ear. Front-end loading is key.

If a contractor has no demonstrable experience of a technology or environment then certainty will take a back seat, but contractors need to rely on detailed preparation.

Contractors are sometimes chosen on a fairly superficial basis. What we see is that choice is often based on an inconclusive belief that because the contractors are “good” in a few known areas, they are good at everything. The more complex a project or the more wide-ranging the work, the less likely they’re not competent or, possibly, even the best at everything. Now, that doesn’t mean they’re not going to be good or, possibly, even the best, but it is a false assumption that being good at managing variance or reporting progression makes them good at devising new technology on-the-fly, supervising subcontractors, or optimizing critical path scheduling. This also completely ignores today’s ever-more frequent reality that the promised level of people may not actually be available or allocated to your project.

The circumstances in which a project is run might entail quite different demands on the contractor. This might impact the choice of contractor and also the type of contract. Let’s say the window of opportunity is very tight and all staff are overloaded. Maybe an expert contractor with a good reputation offering a fixed price is the best way. Almost inevitably the cost will be padded but in terms of resource allocation and likelihood of outcome it can make more sense than extending people even further with the probability of an indifferent result. Alternatively, imagine the client organization wishes to absolutely minimize cost and has available internal resources and there is a need to develop some in-house core skills for future work. In such a case developing people in key areas and maybe managing time and materials is a preferred choice. The type of contract changes and the required spend on external overheads is much reduced.

Chances are that the usual contractor selection process is insuffi- ciently rigorous to meet the demands of changing circumstances and better-the-devil-you-know is hardly the most sophisticated logic.

9: REPORTING

**Fallacy:** Projects showing monthly on-time, on-budget are going to turn out ok.

**Reality:** Anything less than regular Earned Value reporting is inadequate.

Typically the finance team might be sent to audit or challenge and some aspect of third-party cold eyes review is a good idea, but for many the better way is to actively help and support the project manager and their teams by setting up the systems, processes, cost codes, and so forth so that tracking is not a chore.

Towards the end of the project a great deal of experience will have been built up and this must not be lost. Plan-actual comparisons on a range of intellectual and physical activities will have been made possible and these can be used to estimate more accurately similar activities in future projects. If the information is assumed to be proprietary to contractors then much information might well be lost so this must be mitigated in advance.

### SUMMARY

The chances are that in your organization some of the points made in this article will be superfluous. However, experience tells us that finding all these aspects managed to a high standard is like finding hens’ teeth and here we have highlighted just some of the factors to take into account. The good news is that apart from dramatically improving returns, implementing these measures frees up critical resources and reduces stress for everyone.
The Team Is More Important Than the Business Idea

Start-ups are popping up like mushrooms, with the aid of venture capital. But the investment is risky: studies reveal that, in three out of four cases, the investment is never paid back. So it’s all the more important to recognize and abandon flops early on. But when or up until what point is an investment worthwhile? A conversation with Florian Heinemann, founding partner of Project A Venture, an early-stage investment company based in Berlin.

INTERVIEW IRIS QUIRIN

Mr. Heinemann, you yourself were a founder during the Internet boom in the late 1990s. What was it like for you to change sides?

The entrepreneurial experience is very valuable for me as an investor. You’re familiar with the goals and ambitions, but also the difficulties and worries. And that’s how I also know where we as Project A can generate added value for the founders. I wanted to share this knowledge back then, which almost makes switching sides the logical next step.

I think it’s safe to say that you as a former founder have a better eye for whether a start-up has any chance of success. Is that true?

We’ve discovered for ourselves just how important it is to have the right partner at the right time to offer you advice. Our venture capital approach combines capital with tangible support, for example in IT and marketing. This allows us to get start-ups we see as very promising back on track for success, if they happen to run into temporary difficulties.

How do you approach your investments?

We issue venture capital funds of €180 to €200 million, with which we invest in 25 to 30 start-ups over a period of three years, meaning no more than ten a year. We have three or four areas of focus for each fund, such as industry-related digital start-ups or e-commerce. We always invest early on during the seed and early stages and are usually the first fund investor with a time frame of seven to twelve years. It’s difficult to say which areas will prove to be popular, particularly when it comes to tech funds, which is why it makes sense to not limit yourself to one topic. We develop the portfolio for the first three years and then manage it over the next nine, before attempting to sell the start-ups.

Many investors are waiting around for “the next big thing” that will allow them to increase the value of their shares. Where do you expect to find your “rough diamond”?

For the next fund we issue, we’re focusing on Industry 4.0 and industry-related digital topics, but also on digital health, meaning anything that has to do with digital applications in the health sector. We’re trying to invest in models centered around software and data or digital capabilities and digital assets. We’re also continuing to invest in digital infrastructure, meaning companies that help others perform better in the platform economy.

How’s it looking in your portfolio with the trending issues artificial intelligence and Industry 4.0?

We’re just getting started with AI and Industry 4.0 investments. For example, we have microscopy robotics from Berlin in our portfolio. The start-up is developing an AI software that allows industrial robots to imitate human movement. This will make it...
Florian Heinemann is involved as an investor and business angel in nearly 100 start-ups. He earned his master’s degree in Business Administration at WHU Koblenz and his PhD in Innovation Management and Entrepreneurship at RWTH Aachen.

possible to use them in brand-new areas such as the production of electronics and food handling, which require greater finesse. We’re not only supporting the start-up with capital, but also helping with its marketing and communication strategy. That’s important for the success strategy, as the team is still very small and primarily consists of engineers.

What’s your approach to finding the “right” start-up that ultimately has the best chance at success?

We look at 4,500 to 5,000 companies a year and speak to between 900 and 1,000 of them for at least half an hour on the phone. Four or five initial meetings take place every workday with our team of six analysts, during which we go through a list of criteria with around a dozen points, including: How good do we consider the founder to be? How good is the business idea? How do we rate the market opportunities? How have the marketing activities been so far? And how attractive do we consider the exit opportunities to be? With a focus on these criteria, we use an evaluation form and decide which start-ups we want to be involved in. Then there’s a second meeting with one of our partners. If they, too, decide in favor of the start-up, we enter the due diligence stage, meaning we conduct a careful examination: we speak to experts and take another look at the details.

What does that mean exactly?

We create a 20- to 40-page briefing book in which we develop hypotheses based on the same criteria as in the initial application. What needs to occur to ensure that this company can deliver a relevant return, provided everything goes according to plan and our hypotheses occur.

What would you consider to be a relevant return?

If we were to invest between €20 and €40 million and hold 10 to 15 percent of the company, it would have to be worth between €300 and €400 million when it was sold for the investment to really make sense. It’s not just about whether a company can survive and operate. In principle, we’re interested in whether it can achieve a relevant increase in value. That’s the concept.

How good has your success rate been so far?

We’ve only been doing this for seven years, so it’s too soon to really judge. But we can compare our funds to others that started at the same time as ours or to older funds and where they stood seven years in. Based on that, we’re among the top 20 investors in Europe. But we won’t truly be able to say until after ten to twelve years.

What plays a more important role in your investment decisions: the team or the business idea?

The team, without a doubt! Especially in the early stage, the team is more relevant. The later you invest, the more important the concrete facts and figures you have at your disposal become. If the start-up is successful after five years, it doesn’t really matter if you like the team or not. But during the seed stage, the team is the key decision-making factor for us. At this early stage, you can still change a lot about the business model or the idea, as none of it is set in stone. Rather, it all develops over the years.

In your experience, what does the optimal makeup of a start-up team look like?

Much different from a typical medium-sized company, that’s for sure! There you have the patriarch, who makes all the decisions. We’d never invest in a single person. Our teams have at least two, or better yet three or four, founders, ideally with a variety of skills such as IT, marketing, and communication as well as different personalities. We also try in advance to figure out how well these personalities fit together.

Why is that important?

Because we’ve discovered that, when teams fail in the early stage, it’s usually not because of a bad business idea, but rather the personalities of the founding members. And it’s extremely difficult to replace founders during the seed stage. If the start-up is stable, that’s something you can do. But if the team of founders changes too much in the first year or two, it doesn’t usually work.

What does your exit strategy look like?

As a venture capital company, we’re always just a small shareholder. We usually hold 10 to 15 and occasionally 20 percent of a start-up, so a single exit is out of the question. But we make sure from the very start to develop good relationships with exit partners and think about in advance who could eventually buy the start-up. We don’t rush ahead with exits if the company is performing well, but instead wait for the right moment when potential buyers develop interest and actively approach the start-ups, which leads to the highest sales price.

A study carried out by Harvard Business School revealed that, for around three-quarters of the capital invested in start-ups, not a single cent is paid back. How do you determine whether it’s a case of throwing good money after bad? Are there typical warning signs?

Total loss is a normal part of business. Start-ups require new money every 12 to 18 months. Good companies don’t have any problem obtaining new money, as others are investing in them, too. A clear warning sign is, for example, when no one else is interested in investing more. For every investment, we pay very close attention to how the unit economics are developing, meaning how much profit the start-up generates per customer or per transaction. The unit economics should be improving for growing companies. In digital business, start-ups need to be more profitable the bigger they get. If that’s not the case, we know we have a problem. And we first try to solve that problem.

What do you do when a start-up runs into difficulties?

We first check to see if the problem can be solved or not. What makes our VC business model so unique is the fact that we have a large operational team of more than 100 employees, who support start-ups and help them solve problems even in their daily operations. For example, certain procedures can be automated in order to make a company more profitable. Or you can simplify or standardize processes or outsource them to more affordable service providers. If we come to the conclusion that none of that is working and we’ve exhausted our resources, we then have to consider how best to sell the assets that this company still has. We would initiate the process, but you can’t pull the plug without the founders!

More than 60 start-ups failed here in Germany last year and their development costs exceeded €200 million, according to estimates. In your experience, what are the most common reasons why German start-ups fail?

It’s usually a problem in the team of founders or a business model that proves to be inaccessible. But these start-up problems aren’t specific to Germany, though finding capital is more of an issue in Germany than it is in the US.

ABOUT PROJECT A:

Founded in January 2012, Berlin-based investment company Project A Ventures manages €60 million, currently providing around 50 technology start-ups with capital, an extensive network, and access to a wide array of services. Some 100 experts support the portfolio company in its daily operations in a variety of areas such as software, engineering, marketing, design, communication, business intelligence, sales, and recruiting. The investment focuses on business models in the field of digital technologies.

www.project-a.com
Learning from Norway

An impressive 1.4 percent of the world’s market capitalization is in the hands of the Norwegian oil fund. If you take a closer look at its strategy, you can learn a lot about good investment practices – as a private person or an entrepreneur.

Eight successful recipes for clever and better investment, provided by those who really know their stuff.

TEXT CLEMENS BOMSDORF

Oslo, the capital city of Norway, has been gaining attention for its spectacular architecture for around ten years now. As different as they are, these buildings also help to understand some of the basic ideas behind the Norwegian oil fund. With a volume of nearly €900 billion, it’s the largest sovereign wealth fund in the world.

The best way to view the sensational buildings is to approach the city by water, on the ferry from Germany. The first thing to catch your eye is the opera house in snow white Carrara marble, followed by the new tall and narrow building of the Munch Museum and the skyline of the office buildings referred to as the bar code, which aren’t very tall by international standards.

Opened in 2008, the opera house is well-known for the unique feature incorporated by architecture firm Snøhetta: an accessible roof. The elegant building thus offers something for everyone who lives in or visits Oslo. You don’t even need to buy a ticket to stroll along the enormous roof terrace with its fantastic view in a premier location of the capital city.

€165,000 a Head

It’s much the same with the Government Pension Fund Global, usually referred to as simply the “Oil Fund.” Financed by the northern European country’s revenue from raw materials, it has now invested €165,000 for every Norwegian. After all, the fund assets are there for everyone and, through the national budget, should allow every Norwegian to benefit a little from all the money in the “world’s richest country,” a term coined by economist Jon Arne

With a volume of nearly €900 BILLION, the Norwegian oil fund is the largest sovereign wealth fund in the world.
A CASE IN POINT

There should be no doubt as to why an investment is being made and for whom, as this will clarify to whom the investment management is responsible and has to justify itself. A requirement that should probably be fulfilled in investment business.

Provide detailed reports on a regular basis. This will reveal successes and failures in a timely manner, preventing them from being hushed up. Much too often, business life offers the opportunity to conceal bad results. Anyone who, like the oil fund, has to regularly provide detailed reports and thus justify him or herself is unlikely to suddenly encounter unpleasant surprises.

Don’t shy away from a realistic comparison. The return is only as good as the difference to the alternative investment with corresponding risk profile. People who don’t work with investments, in particular, forget all too quickly that an annual increase of three percent can be quite good if most of the other investments are stagnant. On the other hand, seven percent during a boom is not that great.

Slyngstad and the core members of the oil fund management team work in a building that’s much less impressive than the bar dries up. Because of its long-term focus, the fund bear the word “Pension” in its name. Norway has been investing the revenue from its raw materials business in international financial markets – in bonds since 1996 as well as stocks since 1998. Temporary fluctuations are accepted in an effort to achieve solid successes over the long term, or as Minister of Finance Siv Jensen puts it: “The fund should generate the biggest returns possible without too much risk.” While politicians make decisions about the framework conditions, Slyngstad and his team of several hundred employees see to the daily business and invest. Over the past approximately 20 years, the fund has earned on average six percent annually, which is just over four percent after inflation.

Due to its stable success, the fund is often cited as a good example for private investors such as institutional investors. Economists David Chambers, Elroy Dimson, and Amrit Ilmanen talk about the “Norwegian model” in a research paper of the same name. It really can be emulated, as the fund is extremely transparent.

Clear Compliance, Full Transparency

Just as if he were CEO of a corporation and the Norwegians his shareholders, Slyngstad obtains benchmark indices and holds a sort of balance sheet press conference every quarter, providing a detailed account of how the fund has developed and where investments have been made. Investment principles one, two, and three, which Norway recommends for good results, are thus:

1. Keep an eye on the costs. A reduction in costs of 0.2 percentage points a year means a correspondingly higher return. Especially over the long term, low costs often make a significant difference in the return as a result of compound interest and are frequently easier to achieve than an equally high increase in capital gain. Business leaders in the “real” economy know only too well that profit lies to a high degree in the costs. Just 0.08 percent of the fund’s volume is spent on managing the assets. “Management costs have increased more slowly than the fund volume over the long term,” as stated in the annual report. While economies of scale have played a role, this low value is also the result of an intensive focus on costs, a comparably small team, and the fact that fund isn’t there to provide former politicians with well-paid positions, for example. According to the comparison study of Chambers, Dimson, and Ilmanen, “costs and managerialocomplexity” are much lower than they are for similar fund structures, like those used by Yale University to manage its assets.

The Norwegian fund has a bureaucrat at the helm: Slyngstad has been doing the job for around ten years with an enthusiasm that’s hard to miss. That’s probably why this man, who in addition to economics, business administration, political science, and law also studied philosophy, is satisfied with an annual salary of around €800,000 with retirement benefits, which is low in an international comparison of the industry and position. With an expense ratio of 0.5 percent, external consultants are much more expensive than internal management. Still, in Oslo they say:

2. Relate on external parties, too. While a majority of the oil revenue is managed internally, there’s good reason to involve external consultants: to obtain expertise and spur on the in-house department with a healthy dose of competition. But this competition needs to follow strict rules, as fund is unique in another way: it doesn’t simply define an objective. Instead, there’s another principle:

3. Investments are made in accordance with a very clearly formulated strategy, which, of course, can be adapted, but only over time and after having weighed the risk with the opportunity.

The Strategy Is Reviewed on a Regular Basis

The fund has been around for more than 20 years and Slyngstad is the only second head. In the very short fund history there have only been a few fundamental changes, which focused on continuously increasing equities and thus reducing government bonds. That decision is left to the parliament, with the fund management providing their opinion in advance. “We take a look at that every ten years,” says Slyngstad. Equities were upgraded from 0 to 40 percent two years after the fund was created, to 60 percent in 2007 and then by another ten percentage points in 2017. “We’re still not at 70 percent. But I’m quite sure that there will be a discussion in 2027 as well,” Slyngstad recently told Bloomberg Markets magazine, which referred to him as the “Trillion Dollar Man” on the cover.

Money makes the world go around – this is a saying often used to emphasize the fact that ethical behavior and capitalism are mutually exclusive. Norway is a good example that this is simply not true. Certain exclusion criteria apply, much like with long-term mutual funds, which the Socialist Left Party pushed through despite major resistance. These ethical requirements are now a consensus in Norway. “A large part of Norwegian society is against earning money with products that kill. Weapons and tobacco were therefore the first to be excluded,” says Slyngstad. Oil revenue doesn’t go to companies either that violate important workers’ rights.

And thus invest in a way that coincides with the fundamental ethical consensus of the investors. For companies, that means investments also need to conform with the CSR strategy. Norwegian Minister of Finance Jensen offers the final and possibly most important principle:

“Savings cannot take the place of work and value creation.”

A company that no longer reinvests its profits in itself but rather invests them elsewhere should think about whether it’s fulfilling its true objective.
Megaprojects: Milestones or Bottomless Pit?

There are many examples of large-scale projects that have produced one negative headline after the other. Cost explosions and construction delays lasting years regularly cause quite a stir and lead to a bad reputation. Public projects in particular often fall very short of goals and thus serve better as a precedent. A look at failed megaprojects and potential lessons for the future.

The amount of money that could be saved if large-scale projects were managed only ten percent more effectively. For comparison: Germany’s annual gross domestic product is €3.2 trillion.

<table>
<thead>
<tr>
<th>Construction time in years</th>
<th>Cost overrun in %</th>
<th>Total budget in millions</th>
<th>Year</th>
<th>Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>80</td>
<td>15,000</td>
<td>1993</td>
<td>Channel Tunnel (GBR)</td>
</tr>
<tr>
<td>13</td>
<td>125</td>
<td>5,400</td>
<td>2020</td>
<td>BER Airport (GER)</td>
</tr>
<tr>
<td>9</td>
<td>146</td>
<td>112</td>
<td>2017</td>
<td>Elbphilharmonie (GER)</td>
</tr>
<tr>
<td>9</td>
<td>180</td>
<td>865</td>
<td>1981</td>
<td>Humber Bridge (GBR)</td>
</tr>
<tr>
<td>14</td>
<td>220</td>
<td>13,000</td>
<td>2005</td>
<td>Boston’s “Big Data” Tunnel (USA)</td>
</tr>
<tr>
<td>14</td>
<td>300</td>
<td>258</td>
<td>1987</td>
<td>Bank of Norway (NOR)</td>
</tr>
<tr>
<td>12</td>
<td>440</td>
<td>279</td>
<td>1982</td>
<td>Furka Base Tunnel (SUI)</td>
</tr>
<tr>
<td>14</td>
<td>1,400</td>
<td>64.5</td>
<td>1973</td>
<td>Sydney Opera House (AUS)</td>
</tr>
<tr>
<td>10</td>
<td>1,900</td>
<td>63.5</td>
<td>1969</td>
<td>Suez Canal (EGY)</td>
</tr>
</tbody>
</table>

Sources: Bent Flyvbjerg: What You Should Know About Megaprojects and Why: An Overview; Hertie School of Governance: Großprojekte in Deutschland – Zehn Jahre Ambition und Realität; Roland Berger, Think Act November 2015, Megaproject Management: good to know
Globalization and digitization are turning the process manufacturing industry upside down, the impacts of which can also be felt by industry service providers such as Bilfinger: consolidations, a lack of specialists, and digital restructuring make new solution concepts a must. With the level of complexity increasing, plant operators and service providers now need to work more closely together. In the InSite interview, Gerald Pilotto, Executive President of Engineering & Maintenance for Continental Europe at Bilfinger SE, talks about challenges and solutions.

INTERVIEW ROLAND HENSEL

Mr. Pilotto, Bilfinger SE operates as an industry service provider. What has changed in process manufacturing in recent years?

Our customers’ goals haven’t changed over the decades: they’re looking for safe turnarounds, schedule compliance, high quality assurance, and budget reliability. What has changed significantly is the market itself, which has moved towards consolidations and acquisitions. At the same time, more and more plants are being built directly in customer markets.

We also see a high level of consolidation in the supplier market. We ourselves are the best example. Our historical roots can be found in the construction industry. As a result of many acquisitions and divestitures, we’re now a leading supplier of services for industrial plants and power plants, with around 36,000 employees. And consolidation is also on the rise for EPC contractors, primarily due to the lack of specialists.

How are you preparing?

We also need to be in a position to offer our services throughout the entire life cycle and do what we can to extend our value chain – taking into account, of course, the situation in Central Europe, with collective bargaining agreements and working times. The following applies here: Which services can you still provide and how much are you paid for them? Particularly in the context of continuous staff utilization with increasing peak times in spring and fall. This increases the need for coordination, making long-term strategic partnerships between customer and supplier all the more common. We’ve therefore developed our Bilfinger maintenance concept and, on that basis, our Bilfinger turnaround concept as a comprehensive range.

Different cultures, languages, and mentalities don’t make managing staff any easier.

In the case of large turnarounds, I’d say that 70 percent of the employees aren’t native speakers of German. We simply need to involve the external staff in both the planning and implementation phases. Bilfinger SE therefore has its own global network that lists all employees along with their qualifications and training as well as our subcontractors and staffing agencies, organized according to similar criteria. This provides us with a quick overview that also includes their availability. It’s important to us that successful teams stay together, led by employees from the subsidiary in their country, in which case cultural differences don’t play a role. All the same, a project in Belgium works differently from a project in Austria or Eastern Europe.
It’s ultimately always an issue of improvements, meaning higher plant efficiency, higher availability, lower maintenance costs, etc. What potential do you see in digitization?

We can plan very differently with digital media. A digital plant allows us to observe the entire life cycle process in a new way and change the decision-making process. A businessperson can maintain a better overview and that includes procurement costs, maintenance, security, and compliance. While still in its early stages, this form of overall assessment is gaining ground, as it represents an important tool for further increasing productivity.

Digitized processes are also very helpful in reducing the amount of manual administration. That’s because the necessary documentation associated with all of the processes needs to be completed directly online if at all possible and with few intermediate steps. Here we try to digitize existing paper processes and standardize all of the processes.

We founded a start-up and assigned it the clear task of addressing the changes resulting from digitization and identifying added value.

Digitization represents a radical technical transition. Are IT specialists all we need now?

No, we need both. Namely people who understand the plant business and of course people who portray concept developments and processes in software. We thus appointed a Chief Digital Officer (CDO) two years ago who comes from maintenance. We made a conscious decision not to hire a computer scientist, as we need someone who understands the business and can describe the processes. At the same time, we founded a start-up and assigned it the clear task of addressing the changes resulting from digitization and identifying added value for Bilfinger SE. Here, methods and tools are tested, and markets and customer expectations analyzed and translated into technical products.

In your opinion, which social or political changes are absolutely essential?

If we in Europe want to survive in an environment of global competition, we need to talk about education, training, and knowledge exchange as well as the social situation and infrastructure. We won’t be able to survive with cheap staff who don’t have the necessary skills. We’ll never achieve cost leadership, which is why we need market leadership and knowledge leadership.

The way I see it, politicians should create the corresponding conditions for making investment in industry attractive. For example, the new posted workers directive planned by the EU is counterproductive for our industry, as an employee may only be posted for 18 months. After that, the job needs to be filled by a permanent employee. But what do you do when an upcoming turnaround has a much longer planning time frame? You can’t send a different employee. Politicians need to support globalization with the appropriate laws.

When you compare the basic attitude towards the job today with that of ten years ago, what has changed?

First and foremost, employee mobility. Young people aren’t as flexible today as they were ten years ago. They place a higher value on their social and private environment and are generally very rooted to where they are. I’m often surprised at how important it is that the company offer a high job guarantee. It used to be important to have an interesting job and good development opportunities. Money is not as important to the generation of today. They’re more interested in the total package: What does my work-life balance look like? Is there a cafeteria or a gym? Do I have flexible working times? In my opinion, expectations have changed significantly.

Have expectations regarding work performance changed?

Yes, they’ve increased dramatically. Work performance has become much more demanding. In addition to his actual work, a technician now also has to document everything and even contribute to the business side of things. At the same time, he has to observe a lot of guidelines, standards, and extreme safety regulations. The requirements made of employees have increased to some degree.

Gerald Pilotto has been Executive President of MMO, Continental Europe, at Bilfinger SE since 2010. After completing his studies in electronic technology, he assumed the role of project manager as well as location and business unit leader. Gerald Pilotto gained experience as CEO and top manager at a variety of companies, including Ferrostaal and MCE AG, and as CEO of Bilfinger Industrial Services GmbH in Munich.
Robot Revolution: Start-up Solutions
Conquer the Field of Maintenance

The transition to Industry 4.0 also has a major impact on maintenance. The keywords here are “smart maintenance” and the somewhat more specialized “predictive maintenance.” To ensure maintenance is as efficient and farsighted as possible, teams of scientists are in the process of developing modern “predictive maintenance.” To ensure maintenance is as efficient and farsighted as possible, teams of scientists are in the process of developing.

The hardware (sensors) is usually responsible for data collection, and the software (algorithms) for data analysis. The interplay between hardware and software, robots can immediately integrate a software solution and thus play a key role in re-creating costs, increasing plant availability, and minimizing failure costs. The SpotMini may one day be able to carry out minor repair work for inspection work, too. Unlike its competitors, Boston Dynamics doesn’t focus on specific industries in its development. The SpotMini also has an articulated arm that allows it to, for instance, open doors and thus enter closed-off areas. It also has the ability to learn, allowing it to optimize its capabilities with each repetition. Thanks to its articulated arm and the integrated learning algorithm, the SpotMini may one day be able to carry out minor repair work in addition to inspections. Further developing the algorithm could, for example, make it possible to use the robot in reliability tests on machines or machine parts, which would make the SpotMini a shining example of Boston Dynamics’ claim: “We pride ourselves in building machines that both break boundaries and work in the real world.”

The benefits are clear: servicing no longer has to occur at predefined intervals, inflexible intervals, but can be carried out cost-effectively based on the current situation. The safety hazard is also reduced, as inspections in dangerous and hard-to-reach areas can be carried out by robots and/or drones, reducing the danger for employees. Opportunities like these could improve maintenance over the long term and thus play a key role in reducing costs, increasing plant availability, and minimizing failure rates.

The first start-ups have managed to successfully integrate a software solution into modern hardware for end customers. As a result, Mohileye, a manufacturer of driver assistance systems, was able to secure partnerships with several large-scale car companies by developing a new sensor system for collision avoidance. Dan Galvas, Chief Communication Officer of Mohileye, explains this success and the resulting competitive advantage over other start-ups with a few select words: “We have a software.” But that’s not to say that the competition is sitting around twiddling its thumbs – other manufacturers are busy developing robotic applications that offer more than just hardware solutions.

We take a look at five start-ups and their robots in greater detail below.

**COMPANY:** ANYBOTICS, ZURICH
**Product:** ANYmal

Overview: ANYmal is a four-legged robot with autonomous navigation that’s largely used for inspection work in the energy and process manufacturing industries. Its applications include maintenance and reliability reports in the context of machine monitoring as well as sensor reading. The robot can also be used for safety assignments, for example, in the area of power supply. ANYmal is suitable for older oil facilities, where shorter inspection intervals are necessary to minimize the increased risk of failure. Its design and performance data (high payload, three hours of running time, speed of 1 meter/second) make it possible to carry out urgent routine inspections for a relatively affordable price. More data can thus be collected than before with the same payload, three hours of running time, speed of 1 meter/second) make it possible to carry out urgent routine inspections for a relatively affordable price. More data can thus be collected than before with the same.

ANYmal is a four-legged robot that can move autonomously in difficult terrain and safely interact with the environment.

**COMPANY:** BOSTON DYNAMICS, WALTHAM (USA)
**Product:** SpotMini

Overview: Similar in its design, construction, and performance data, the SpotMini boasts exceptional mobility, making it suitable for inspection work, too. Unlike its competitors, Boston Dynamics doesn’t focus on specific industries in its development. The SpotMini also has an articulated arm that allows it to, for instance, open doors and thus enter closed-off areas. It also has the ability to learn, allowing it to optimize its capabilities with each repetition. Thanks to its articulated arm and the integrated learning algorithm, the SpotMini may one day be able to carry out minor repair work in addition to inspections. Further developing the algorithm could, for example, make it possible to use the robot in reliability tests on machines or machine parts, which would make the SpotMini a shining example of Boston Dynamics’ claim: “We pride ourselves in building machines that both break boundaries and work in the real world.”

ANYmal is a four-legged robot that can move autonomously in difficult terrain and safely interact with the environment.

ANYmal is a four-legged robot that can move autonomously in difficult terrain and safely interact with the environment.

ANYmal is a four-legged robot that can move autonomously in difficult terrain and safely interact with the environment.

ANYmal is a four-legged robot that can move autonomously in difficult terrain and safely interact with the environment.
MANUFACTURER: CAMBRIDGE, MA (USA)
Product: HAMR
Overview: The Harvard Ambulatory Microrobot (HAMR) is much smaller than the two robots already presented. The developers themselves refer to it as “cockroach size.” And it’s precisely this small size that accommodates much smaller areas of application than other models. Developed by Harvard University in collaboration with Rolls Royce, the HAMR is also less susceptible to damage than its competitors thanks to its compact design – even when it falls from higher up. It also offers a high working speed and is flexible when it comes to overcoming obstacles.

These characteristics allow the HAMR to also be used for inspection in machines and engines that you’d otherwise have to stop and, in some cases, dismantle. Because disassembly, which can be very time-consuming and expensive for many companies particularly in process manufacturing, is no longer necessary, the HAMR can play a key role in maintenance work that ultimately conserves resources. But the HAMR does not yet offer its own software solution – solutions would have to be purchased separately.

Company Statement: The inspections “are completely automated, removing the maintenance staff from any dangers and tasks that can be automated.”

MANUFACTURER: SKYSPECS, ANN ARBOR (USA)
Product: Analysis Software
Overview: SkySpecs offers inspection solutions for the wind energy sector, with a focus on maintaining wind turbines – thanks to the use of drone technology on and offshore. According to a company statement, the inspections “are completely automated, requiring only the push of a single button through to landing – and take less than 15 minutes.” SkySpecs has taken the opposite approach to the start-ups presented before: the hardware – in this case in the form of drones – is purchased externally, while SkySpecs has developed an analysis software itself.

The drones are used to maintain wind turbines and can detect damage. The data collected are transmitted directly to the analysis software and analyzed. Benefits for the employees: they can create maintenance reports and other reports more quickly and, if necessary, make last-minute decisions about any repairs.

While employees have to analyze the transmitted data at present, SkySpecs is working on an algorithm that one day will be able to analyze data directly. Although a majority of the wind energy sector still relies on manual inspection when it comes to turbine maintenance, the software solution could make SkySpecs’ inspection much more efficient and less risky.

Company Statement: “Maintenance projects in process manufacturing, focusing on the evaluation of technological trends and technology-based optimization potential in maintenance, among other things. Through his work, the qualified economist (master’s degree in banking and finance) combines his career experience in the fields of finance and business model analysis with current maintenance projects.”

Summary:
Maintenance Sector Is on the Brink of Accelerated Development

The presented applications reveal the direction in which maintenance is moving as a result of technologisation. Most exciting will be the areas in which robots combine with intelligent software solutions, bringing us ever closer to the transition from mere data acquisition to the creation of maintenance reports with concrete instructions. In a scenario like this, the robot would collect data and then transmit it to an ERP software (e.g. SAP PM), which would then plan any required or future repairs.

An alternative option for developing smart maintenance reports would be to provide robot start-ups with manufacturer data directly. This direct method would offer the benefit that robots would have data at their disposal from the start, rather than first having to collect them. In addition to manufacturer data, you could also incorporate the experience of industry experts when it comes to defining the maintenance strategy’s areas of focus.

Using advanced data analysis software and artificial intelligence, robots would even be able to autonomously collect and condense maintenance-relevant data in a targeted fashion, which would further increase the feasibility of today’s “preventive maintenance strategy.”

As a Senior Consultant at T.A. Cook, Kaessra Schneeberger supports global maintenance projects in process manufacturing, focusing on the evaluation of technological trends and technology-based optimization potential in maintenance, among other things. Through his work, the qualified economist (master’s degree in banking and finance) combines his career experience in the fields of finance and business model analysis with current maintenance projects.

k.schneeberger@tacook.com
In the age of specialist shortages, good HR policies are more important than ever before when it comes to retaining your own employees and thus their expertise as well as recruiting and integrating new experts. And to do that, you need a strategy and expedient investments. A conversation with Maren Stieler, Director of HR at T.A. Cook, about her interpretation of retention and recruiting.

INTERVIEW JENS ROSPEK

Ms. Stieler, you’ve been with T.A. Cook for a good two years now. Why would you still like to be working here in five years? It’s simple: because at T.A. Cook I can actually feel the trust and have the opportunity to assume responsibility. I need to feel comfortable in my work environment and, for me, that’s only possible with a positive and actively embraced corporate culture and certain values such as responsibility and trust. On this basis, I have the opportunity to actively participate in the success and future of T.A. Cook as well as develop personally. This always keeps me motivated and allows me to cope with the tasks and challenges that I face in my job.

The corporate culture is an important factor for you. What is it exactly that makes the T.A. Cook culture so unique? Humanity, honesty, and authenticity. Everyone really supports each other here and that’s something employees feel from the beginning. We do everything we can to ensure we fit together as well as possible. The “cultural fit” is a key factor for us.

T.A. Cook boasts relatively low employee turnover and many of your colleagues have been with the company for a very long time. Is the culture you mentioned the secret ingredient? It certainly plays a key role. After all, no one wants to work for a company whose attitudes and values don’t correspond with their own. I think our employees prefer to stay with us because we can offer them a very good overall package. Of course, a good salary and a variety of benefits and incentives are important, too. But you won’t be able to hold on to your staff with fresh fruit, water, and free coffee alone, which is why we try to support employees as well as possible in every aspect of work life. They can structure their workday themselves in many areas and have continuous access to the information they need. They also benefit from intensive communication with their colleagues and supervisors. All of these aspects can be summed up in the term “empowerment.”

What does “empowerment” mean exactly? Our employees can and should contribute. We offer them the option to structure their work as they see fit and give them a great deal of responsibility. And there’s an open feedback culture, too, which is also demonstrated by the fact that more and more especially younger employees request feedback of their own accord. Employees communicate openly and honestly with each other whenever they need anything, which also has an impact on our training options. With a tailored training and development program, we offer employees what they need to continue developing professionally.

Studies reveal that individual development is an important retention factor today. What strategy does T.A. Cook pursue? We offer employees the option to select learning opportunities themselves and tailor them to their personal requirements. We believe that the right mix of classroom-based courses, virtual learning formats, and self-learning is the key to success. In concrete terms, that means that communication with customers is the starting point. Particularly when it comes to projects that address
the identity of our customers and their company, the right custom-
er communication is everything. To maintain that over the long-
term, we developed a comprehensive training concept with an
external agency last year. But first we had asked the employees
about their wishes and requested feedback from our customers.
After that, every employee, from consultant to partner, underwent
this program. Here, too, we made a conscious decision to mix
classroom-based training, webinars, virtual learning cards, and
tailored one-on-one coaching.

Rather than taking the more conventional approach, you
invest significantly in your employees. Why is that worthwhile?
Because it supports our strategy of retaining employees over the
long term. Questionnaires reveal that learning and knowledge in-
creasingly play a more important role than salary and benefits. But
our strategy will only work if we offer our employees what they
need and not just any training courses. Of course, that’s ultimate-
ly also essential for us as a company. Our aim is to advise custom-
ners with our expertise to the best of our ability. This is most effec-
tive when our employees work with the customers over the long
term and have a detailed understanding of their needs, strategies,
and objectives. For us, that means the longer we can build on the
employee and their expertise, the more likely it is that the described
scenario will come to pass. That’s why, in addition to further de-
veloping soft skills, we also invest a great deal in developing exper-
tise and try to cover as wide a field as possible from the very start.

How do you offer training opportunities when your employ-
ees often spend time at different locations?
Thanks to our blended learning program, our employees have
digital learning cards, webinars, and virtual classrooms at their
disposal, which they can access from anywhere at any time. Our
program is rounded off with classic classroom-based training
courses and tailored coaching. Our employees often use Fridays
for training measures, as they’re generally only with customers four
days a week.

In addition to external training courses, corporate learning,
which is learning inside the company, is becoming more and
more important.
Exactly. Every employee has a mentor they can turn to, even infor-
mally. But another important point here is the fact that some of
the expertise remains with us beyond employment. For example,
we had a leading authority in SAP at the company who officially
retired two years ago, but still makes himself available to T.A. Cook
on some days and then works very closely with the younger em-
ployees in particular. He’s familiar with the company and the cus-
tomers and allows others to benefit from his expertise.

Does this knowledge exchange also work from young to old?
Absolutely. We’ve established reverse mentoring and promote it
whenever and wherever possible. It not only refers to age and career
experience, but also the position at the company. For us, reverse
mentoring is also an interdisciplinary and nonhierarchical knowl-
edge exchange. All of that brings a breath of fresh air to the com-
pany, particularly for employees who have been with us for a long
time. We hired 60 new employees in 2018 alone. Of course, they
bring new ideas and knowledge with them to the company and we
encourage them to actively contribute these as well. Ideally, this
means that a partner who has been with T.A. Cook for 15 years and
has a 20 years of experience can learn from an employee who is just
beginning their career as an engineer.

T.A. Cook invests a lot in employee retention. But at some
point, even the most loyal employee retires or changes jobs
for personal reasons. In both cases, a replacement is
essential. How do you acquire staff that has the necessary
qualifications and identifies with the corporate culture in an
already sparsely populated specialist market?

By consciously communicating the fact that we’re looking for a very
specific kind of collaboration and that communication is usually
our focus. As a medium-sized company, we tend to receive fewer
unsolicited applications and are not that well-known in the gener-
al public, as we occupy a niche with specialized knowledge. For us,
that means when an applicant is made aware of us and then goes
to our career page, they ideally need to say without hesitation: “T.A.
Cook is the company with these values and attributes. That appeals
to me and sounds exciting. I want to apply here.” The employees
are our priority, as is the question of how they can best develop
with us. Of course, this will ideally culminate in a long-term rela-
tionship. At the same time, the applicant should be able to under-
stand as quickly as possible what we do, because we require very
specific qualifications in our niche.

But this strategy also means that you don’t attempt to address
all applicants, but rather limit your target group.
Yes, you could say that. We’re not interested in every potential
employee, but that’s a conscious decision. We’re looking for appli-
cants that are a good match for us, our company, and our values.
The cultural fit is very important to us and ultimately the secret to
our success: the better we’re able to select an employee that’s a
good fit for T.A. Cook, the more likely it is that they will stay with
the company for longer. Limiting the target group in advance is
virtually unavoidable.

In that case, does it also mean that a future employee has to
be a good fit for T.A. Cook’s corporate culture in particular,
while the qualification takes second place?

I would express it differently. The qualification is, of course, im-
portant particularly for us. The keyword is expertise. But even if
someone has the best references, they’ll be gone again before you
know it if their value culture and structure don’t conform with ours,
which isn’t helpful for either side. That’s why it’s so important to
us as a company that prefers long-term working relationships to
find out if the applicant is a good fit for us. Humanity is therefore
just as important as the specialized qualification.

And how do you communicate the values of T.A. Cook
to applicants and new employees?
Through personality. That’s exactly the aspect that allows us to
distinguish ourselves and that sets us apart. Our employees and
their wishes, aims, and further development are important to us.
Of course, that begins internally, but from there has impact on the
recruiting process. We’re very successful, for example, with the
concept of “employees recruiting employees,” meaning our em-
ployees function as brand ambassadors. And even when interacting
with interested applicants, we try to connect with them as soon
and directly as possible, beginning with the career page: when an
applicant arrives there, they first see employee statements and
interviews as well as personalities – long before any job ads.

Apparently, your investments and efforts have paid off: T.A.
Cook has officially been a “Great Place to Work” for weeks
now, making it one of the best 100 employers in Germany.
What was your first reaction when you heard about this honor?
I was unbelievably proud. On the one hand, because I’m part of a
wonderful company and, on the other, because I can do my part
every day to help make T.A. Cook a popular employer.

With a tailored training and
development program, we
offer employees what they
need to continue developing
professionally.

Our aim is to advise cus-
tomers with our expertise
to the best of our ability.
This is most effective
when our employees work
with the customers over
the long term and have a
detailed understanding
of their needs, strategies,
and objectives.

Maren Stieler has been Director of
HR at T.A. Cook since 2016, respon-
sible for both operational and stra-
tegic personnel management. The
versatile HR generalist had already
gained international experience in
the services sector, having spent time
in the US, Switzerland, and other
locations. The 42-year-old, who has
a good feel for people and culture,
and her team are responsible for 160
employees around the world.

Photo: Michaela Meier
Scientists tend to be solitary people – there’s no shortage of clichés like this. It only takes Katja Neuthe, who has a PhD in chemistry, a few minutes to discredit stereotypes like these, beginning with her casual look. Any remaining doubts vanish with the ensuing conversation. “It’s important to me not to conform with any clichés,” she explains smiling. A Berlin resident by choice, Neuthe began searching for a job that would combine both of her career interests. And she achieved her goal the moment she was hired by T.A. Cook: “I don’t work as a chemist, but I spend a lot of time in the industry, can contribute my knowledge, and still develop solution concepts.”

Communication Talent at Second Glance

Bringing together viewpoints that may be conflicting or difficult to reconcile, accommodating the needs of everyone involved, breaking down complex developments so that everyone can understand them, formulating clear messages, and striking the right note: corporate communication is a very multifaceted discipline. Katja Neuthe, who was born in Mecklenburg, has many of these characteristics. But consulting wasn’t originally her career goal. It wasn’t until her PhD program that she realized she could also put her communication skills to use full time: “I spent my days in the laboratory and evenings working in service for a company that takes photos for marathon events. A short time later, I was managing the service department and supporting event management, and that’s when I realized: ‘I’m simply a people person,’” she says.

After acquiring her PhD (title: “Synthesis and characterization of transition metal-based dyes for application in dye-sensitized solar cells”), Neuthe began searching for a job that would combine both of her career interests. And she achieved her goal the moment she was hired by T.A. Cook: “I don’t work as a chemist, but I spend a lot of time in the industry, can contribute my knowledge, and still do what I’m good at: speaking, coordinating, and developing concepts.”

Prototype of Modern Consulting?

She’s been working as a consultant since 2018. Her rather unusual life journey has even helped her with her career tasks, as the challenges facing consulting are increasing at lightning speed in the age of the digital transformation. “Classic consulting is out” was the heading on the cover of the Capital business magazine nearly two years ago. But Katja Neuthe differentiates between old and new consultants: “For me, an old consultant means: you go to your customer and look at a project from the outside before making your recommendations. New consultant means: you understand the customer’s needs and actively assist with implementation. It’s no longer just about recommendations – the service concept has become much more important. Customers not only want to be advised, but also understood.” She fully believes that this trend will continue. “More and more customers require this type of advice, as digitization is far from over. So there need to be more people like me,” she says and laughs. But for her it’s important to be able to do this with others. Katja Neuthe is not a lone wolf, but a team player, which she also demonstrates in her free time when she’s playing beach volleyball. “My life motto is ‘Together we can change the world.’ I try to do my part to make the world a little better, but not on my own. As in my projects – working together towards the goal one step at a time.”

Communication and positive charisma: “I listen carefully and willingly and take down complex developments so that everyone can understand both positions and their different points of view and find common ground.”

The technological transition demands a great deal from companies and employees. To ensure the transformation to Industry 4.0 is a success, consultants now need to create a balance between the present and future. Katja Neuthe feels right at home in both the old and the new digital world – and is thus a pioneer in a new type of consulting.

TEXT JENS ROSPEK
N of every idea has to be large-scale – even marginal changes can have a big impact. T.A. Cook has been presenting the MAINTAINER award to companies for smaller and larger innovations for 20 years and thus emphasizes the importance of maintenance for operational productivity in the industrial environment. But for such an important anniversary, it’s not only worth looking at brand-new innovations, but also the ideas of past years. How have the innovations of former winners developed? INSITE is looking at brand-new innovations, but also the ideas of past years.

Digital Rather Than Analog: Equipment Transfer Made Easy

In the category “Excellence in Maintenance & Technical Service,” the MAINTAINER award this year went to Evonik Technology & Infrastructure GmbH. The company was acknowledged for its I-Qui app, which should significantly simplify registration and documentation of technical equipment using QR codes. The app thus solves a central problem: the transfer of technical equipment from the digital world.

I-Qui registers the equipment, most notably nameplates, via QR code and then allocates every component to a digital data set. In turn, these data can be processed by maintenance and servicing software, making plant maintenance a whole lot easier. “Thanks to the digital master data set, I-Qui has laid the foundation for transforming existing plants,” says Karina Słoniowska, technical services employee at Evonik.

Virtual Assistant: Marvin Helps with Complex Issues

This year, the special MAINTAINER award for innovation went to T.CON GmbH & Co. KG. T.CON secured the prize with its Marvin chatbot, which complements a mobile maintenance solution. While using apps to digitize paper-based processes has been an integral part of maintenance for some time now, utilizing many solutions is often a complex and confusing process. That’s where Marvin comes in: as a virtual assistant, the chatbot is available to help employees with any questions or problems they may have. It thus provides information from relevant IT systems, in particular SAP PM/EAM, and, if desired, can even carry out simple bookings. Technically based on the SAP Conversational AI platform, the chatbot can be integrated into a variety of communication and messenger systems. Due to the practical approach, it should come as no surprise that Marvin has already attracted a great deal of interest:

“The initial feedback from interested parties has been very positive. We look forward to tackling the first customer projects in the coming months,” reports Norbert Köhler, Product Manager and Solution Architect at T.CON.

Economical and Fast: Video Wiki Simplifies Maintenance

In 2018, the special prize for innovation went to InfraServ GmbH & Co. Knapsack KG. The company secured the award with a video wiki that employees can access from anywhere at any time. “It allows us to quickly and safely carry out repairs and maintenance of all kinds. The wiki should also intensify exchange among employees and experts,” explains Sven Meurer, Head of Site Management & Maintenance Technology. Among other things, employees can use the feedback button to ask questions and/or give feedback. All questions go directly to the person responsible for the video and are answered in dialogue. Initial successes have already been measured since it was established. “According to an employee questionnaire, the wiki accelerates processes and makes them more efficient. Some employees were even able to make repairs more quickly than usual using the video instructions and, in some cases, were no longer dependent on external support. Both have reduced maintenance costs,” says Sven Meurer. InfraServ is currently working on further improving the wiki and the corresponding app. But this is only the beginning: the video wiki is the first phase of a three-stage model for introducing augmented reality. The model should be implemented gradually over the coming years as well as promote digitization at InfraServ with additional innovations.

Modern Risk Analysis: Data-Based Approach for Low Maintenance Costs

In 2017, Novartis Pharma Schweizerhalle AG won the MAINTAINER award in the category “Excellence in Maintenance & Technical Service.” The winning project addresses the issue of “Value-Oriented Maintenance,” which aims to improve risk assessment. Plant evaluation used to be carried out in an Excel table in which practical experience had been collected. The idea was to replace this approach with the newly developed Business-Focused Asset Criticality Assessment Tool. “The new tool is based on figures and data. Maintenance and failure data and financial figures are entered directly from SAP, ensuring all aspects are taken into account in risk analysis. The facility manager also maintains an overview of the machinery, capacities, and risk of failure at all times,” explains Pasqualle Petrella. ChemOps Operations Manager at Novartis.

The new cost-tracking tool has allowed the company to reduce maintenance costs in ChemOps by double-digit percentage points. Maintenance costs fell from CHF 39 million in 2014 to CHF 29 million two years later, with consistently low risk of failure and a considerable increase in plant reliability. While the tool is still operating reliably, Novartis will continue to look for ways to reduce maintenance costs: “The more data there is and the better it’s prepared, the more cost-efficient and focused the maintenance is. And that, in turn, requires digital innovation,” says Pasqualle Petrella.

Say Goodbye to False Alarms: Intelligent Health Monitor Enables Proactive Maintenance

In 2016, the MAINTAINER award went to algorithmica for its Intelligent Health Monitor (IHM). The IHM analyzes the alarm signals of pumps, turbines, and compressors – not individually, but as a whole – thus dramatically improving condition monitoring. “When signals were analyzed individually, false alarms occurred repeatedly and critical situations were not correctly detected. By analyzing signals as a whole, damage can be detected and proactively prevented days and even weeks in advance,” explains Dr. Patrick Bangert, CEO of algorithmica. He points out that this has resulted in a transition from reactive maintenance to proactive maintenance and reduced costs by up to 90%.

The Intelligent Health Monitor software is now frequently used in process manufacturing, including at Evonik. “IHM can also be found in Europe, North America, Asia, and the Middle East,” says Bangert. The algorithmica team regularly works on further developing the tool, with two updates generally released each year. According to Patrick Bangert, the tool will also be further optimized in the future, as maintenance just isn’t possible anymore without state-of-the-art software: “A typical plant has tens of thousands of signals, all of which provide important information. No person can handle all of that. We need innovation to do that.”
Expanding Both Knowledge and Networks

In the age of digital transformation, sharing personal experience is more important than ever before. Our conferences and workshops are designed to not only show you new methods, approaches, and innovations based on cutting-edge technologies, but also provide a platform for discussion with other specialists and managers. This will provide new ideas and inspiration for optimizing your business over the long term. You can find an events overview at: www.tacook.com/veranstaltungen

EXPLOITING MOBILE SOLUTIONS, MAINTENANCE, AND SERVICE

This user forum shows how advancing digitization, connected data and machinery, and mobile devices can all be used to boost profits.

November 14 to 15
Düsseldorf, GER

INTERACTIVE TARFIGHTER TRAINING WITH SIMULATION

Unpredictability is part of the job in turnaround projects. A computer-based simulation helps decision-makers learn how to deal with them in practice without any (real) risk.

23 to 25 September
Edmonton, CA
11 to 10 November
Houston, USA
19 to 20 November
Birmingham, UK
04 to 06 December
Berlin, GER

DIGITAL TWINNING

As a virtual model of reality, the digital twin has the potential to completely revolutionize production plants’ planning, optimization, and operations.

May 7 to 8
Berlin, GER

SAP EAM

At SAP EAM, the largest independent user conference, specialists and managers come together with IT representatives and SAP experts to discuss the use of intelligent SAP solutions in maintenance and technical services.

June 5 to 6
Potsdam, GER

CCGT O&M FORUM

This event allows operators to share valuable information about plant operation and generation, turbine life cycle management, and service life extension.

June 11 to 13
Birmingham, UK

INTERNATIONAL SAP CONFERENCE FOR ASSET MANAGEMENT

The latest findings show you how to digitally transform asset management at your company with SAP innovations.

September 24 to 25
Madrid, SP

ANNUAL TAR CONFERENCE

At T.A. Cook’s established annual TAR Conference, turnaround experts come together from all over Germany to discuss key industry trends and topics.

January 29 to 30
Potsdam, GER
INVESTMENT:
The long-term commitment of financial resources in tangible or intangible assets.

www.tacook.com