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Chapter 14

Aircraft construction faces adaptive challenges

The Augsburg factory is an EADS production site where aircraft parts are made and assembled. It has been on a roller-coaster ride in the last 12 years, running the risk of flying off the track and being closed, like other factories, as part of the DASA restructuring exercise between 1992 and 1996.

There were phases when the five-year business plan was showing losses in three figures of millions, and a 1994 benchmark study showed the factory 30 percentage points away from the world leaders. A radical transformation was tried in 1996-1997, despite the risks involved. The experiment paid off, the factory is now one of the most profitable in EADS and sets a global benchmark for some manufacturing skills. It has a healthy order-book - not too little and not too much - and reacts flexibly to changes in the industry.¹

Four phases

The history of the factory in the last twelve years can be divided into four phases using the principles formulated in the book.

1. Fatal equilibrium

The Augsburg factory is a location with a long tradition. The first aircraft were made here as early as 1917, and the world's first jet plane, the ME-262, was built here in 1942. In the late 1980s, Augsburg had been consistently successful for twenty years. By then it was mainly involved in producing Tornados for the Ministry of Defence, and employed 2500 people. The situation deteriorated increasingly from 1989. After the fall of the Berlin Wall, and as power structures changed in Eastern Europe, defense budgets were frozen and all strategic scenarios were in a state of change. No more Tornados were commissioned. Decisions about building the Eurofighter were also postponed, and civil aviation orders slumped as a result of the Gulf War. It was clear that the once comfortable order-book situation based on building military aircraft would never again apply on the same scale. But the factory was not productive enough to handle the only alternative, switching to manufacturing and assembling civil aviation components. Also, the factory was geared up to running its projects on the so-called Cost Plus basis: there was not competition: all Augsburg had to do was prove to its public sector client that the factory was keeping to the legal guidelines. A profit was then added to these costs.

Banal example: the factory even earned money on the electricity for the lamps that were not switched off at night.

The focus was directed outwards, and increased productivity was an unfamiliar notion. Competitiveness was unheard of.

The organization was run strictly functionally, and on centralized lines. There was the planning department, the control

department and the production side. But for decades commercial success had been guaranteed by a small group of employees in the finance department who were in charge of providing firm evidence for the deductible costs. So in the early 1990s the Augsburg factory was not competitive, trapped in fatal equilibrium and faced with closure.²

2. Operative management

In 1992, the then DASA aviation director and present German railway boss Hartmut Mehdorn sent a manager called Gerhard Bock to Augsburg to see if it was possible to save the factory despite the anticipated catastrophic losses. Gerhard Bock is a hands-on and experienced manager. He analysed the situation and implemented a series of painful changes very rapidly: reduction of the workforce from 2,500 to 1,500, privilege cuts, reorganization, securing additional Airbus orders, investment in technology and processes. These measures bought the Augsburg factory limited breathing space, but did not go anything like far enough. DASA's losses, which ran into the billions (1995: 4.2 billion marks),³ the lack of a contract for serial production of the Eurofighter and the difficult marketing conditions meant that the situation was becoming even more threatening.

Gerhard Bock remembers:

“When we realized that the restructuring measures taken so far would not be enough to ensure long-term survival, I was bothered by one question in particular: why do the hoped-for results not come when you turn the organization screw and invest in production technology and IT? I thought back over my thirty years of professional experience. The answer was quite simple when you looked at it that way. We only make a real and lasting impact when we manage to engage the workforce like they've never been engaged before. But how should we approach that? I had a reputation as a hard-nosed trouble-shooter, and my team was not known for its kid-glove approach either. But two things were definitely true:

1. We had to be competitive world-wide in two years time, and stay competitive.
2. We had to achieve that with our workforce.

And that meant that we had to make much profounder changes than before.”⁴

3. Working for change on the edge of chaos: So Bock introduced the A-Top 98 project. In order to create the necessary innovative ability, he and his project team took the factory to the edge of chaos. And within two years, the factory was back on its feet, as a result of radical measures: a transition from a centralist and functional to a process-related fractal organization, re-engineering of core processes, internal re-applications for over 100 management positions, central IT structures replaced by a decentralized IT system, linked by an electronic market place, far-reaching and continuing change of the organization's culture. Despite all the risks and difficulties, all the project targets were met in the end, and the factory's productivity was doubled as a result of the changes.⁵

4. Rough world of survival:

The general situation has not become any kinder since then. Increasing Airbus production by over 100%, transition from DASA to EADS, Airbus launched as an independent company and the Augsburg factory's resultant transition to a sub-contractor, reduced production after 11 September – to name just a few of the challenges in an increasingly rough world of survival. But the Augsburg factory rose to these challenges after its deliberate shift to a complex adaptive

system, and proved its capacity to survive in a rough environment.

Phase three was the phase in which the change actually took place. We would like to emphasize some essential aspects so that we can analyze the transformation more precisely.

Germ cell Action Lab

By late 1995 the management had decided to rise to the challenges and allow a project team to develop a completely new business model. The Action Lab method was chosen because it promised radical solutions in a short space of time, building on the intelligence of the lab workers.

Gerhard Bock had formulated his aims very precisely: world competitiveness within two years, using the existing workforce. That and nothing more, but pursued uncompromisingly. So attention was automatically directed to the company's internal structures. They were rigid, hierarchical and not transparent, and unsuitable for the future. The centralist power flow had to be stopped, and a completely new concept found, and it was vital that the workforce should accept this and be bound into it.

We have to pause for a moment here. Let's look at this point a bit harder and ask ourselves: what exactly does that mean? Traditionally structured factories, and Augsburg was certainly that, had always been managed hierarchically. The brain and the power were right up there at the top, that's where visions were formulated, contexts created and decisions made. These were then passed down to the lower echelons in the form of detailed instructions. The production workers, the truly productive force, were not allowed any real say. This system was essentially structured on the principles of feudalism: all the power lay with the king, and he handed it down in little portions to the peasants and craftsmen. They were the ones who kept the whole economy going, but within the power game all they were doing was implementing passively.

Under closer consideration, Social Engineering turns out to be nothing other than a modernized late form of this structure. We have complexity researchers like Richard Pascale to thank for the insight that these structures have to be transformed, in order to unshackle the workforce's innovative ability, and its passion.⁶

The Action Lab started work in early January 1996. Nine capable managers from different disciplines with a high degree of social acceptance were released from their duties and given three months to develop the key features of a new business model.

The Lab's first decision was to agree on some unusual working principles:

- 80/20 rule. This states that 80% of all problems can be solved in 20% of the time. It is only detailed work and applying the final polish that make processes laborious. In concrete terms this meant not even trying to solve all problems down to the last detail, but getting on top of most situations with only a few rules.

- Timebox: take one third of the time needed to solve certain problems. This boosts the adrenaline, creativity blossoms, people work spontaneously, they are lively and alert. Many people do this subconsciously by putting their work off so long that it is almost too late.
- Right to left principle. Don't analyze what's there already, but create a vision: what will our work look like when we're the world benchmark? Then you take this design for the future and follow the steps gradually back to the present.
- Finger on the pulse: the Action Lab team and the factory management meet fortnightly. Draft ideas are discussed, not finalized concepts. This produces flexibility and a new, open kind of co-operation. Decisions are taken immediately they fall due.

The team members started work with a mixture of enthusiasm and skepticism.

"We were thrilled to bits in one respect! We were meant to design a fundamentally new business model within a few weeks and then introduce it coherently. But how would it work? With colleagues we'd been fighting about function issues for years? With bosses who saw us as representing their departments' interests? With a factory manager who was used to wielding authority and normally wouldn't let a single concept through that he hadn't largely developed himself? We all understood how urgent the problem was, but we were appropriately respectful of it. We had worked in the existing business model for years, and couldn't imagine that it was possible to do things differently."⁷

The first outlines started to emerge clearly after discussing a few case studies, making some best-practice visits, brainstorming sessions and intensive conceptual work in small groups. We had to be able to introduce process-oriented working practices, overcome the dominance of the finance department and simplify the complex and elaborate planning and control processes to revitalize real flexibility and creativity. We couldn't attempt to describe the new business model in detail in a fat manual. We had to put down the essential principles in a few pages, then the next step would be to work out enough details to be able to start putting them into practice. The rest of the detailing could be left to the creative intelligence of colleagues on the spot.

The Lab team agreed on two basic principles after long discussions:

1. Take definable construction groups or manufacturing processes and create organizational units (fractals) around them that were as autonomous as possible and equip them as though they were independent concerns.
2. Establish crystal clear customer/supplier relationships where customers say how much they want of what and when, and receive it from the supplier precisely to the day.

Setting up these simple guidelines would effectively eliminate the entire catalogue of traditional control structures in one fell swoop and at the same time push the whole company to the edge of chaos. We remember Chris Langdon's computer simulations, that the right kind and number of rules create the liveliest pattern, in other words conditions at the edge of chaos. These are ambivalent conditions: there is still enough order to avoid plunging into complete chaos, but also enough disorder to allow for diversity and adaptation.⁸

This did not all run smoothly. There were extremely violent clashes within the team and with management, essentially about the question: can it possibly work? What will it mean if we cut out a central overview of our processes and trust that the principles we have distilled out of our thinking will work and trust the workforce's ability to get the new

processes up and running ? It was crucial in formulating these principles clearly and sticking to them that the plant director did not let go of the initial objective to become competitive in the global market. It was clear to all concerned that this could be achieved only by taking a radical approach, and that compromises between the old and the new model could at best lead to mediocre results. Confidence within the team slowly grew about holding their ground under difficult conditions.

The team set about the work of thinking through the implications of the two basic principles for the business model as a whole. What would implementing them mean for the organization, for information technology, for the accounting procedures and the management systems? There were regular attempts to cling on to tried and trusted procedures and thus compromise the compelling power of the scheme as a whole. The finance department in particular had problems with giving up its previous dominance and coming to terms with its new supportive role.

Then the necessity that the project team had acknowledged of thinking through a far-reaching reorganization and formulating a new organizational model almost caused the entire project to break down. The dangerous dead point was reached when management recognized the far-reaching consequences of the changes. They had been all for great progress and a radical approach, but theory is one thing, and suddenly seeing your own sphere of influence at risk is another. The realization that the new structure would stop at no one, that everyone must be prepared to expose themselves to it and accept personal risk, which can also mean radically questioning your own future, came as something of a shock. It was a major help in overcoming the greatest difficulties that the factory director was determined to keep to the target fixed without cutting anything out. This target was attractive enough to win through, not least with the aid of the team members' now more powerful ability to question their own bosses and to attach more value to company interests relating to project aims than to departmental interests.⁹

In retrospect, all the essential concepts were developed in the lab phase and had permeated to such an extent in the new conflict culture that the key players could have passed the basic principles on in their sleep. A germ cell for the new way of working had emerged, and as it emerged it had reflected on the process by which it emerged and consciously understood it. What had to be done now in terms of further detailing and implementation was to apply tailor-made versions of the now fully internalized lessons and principles to the situations and workforce members concerned. Here the inevitable misunderstandings and crisis situations were seen as fuelling the implementation process and not as a barrier to success.

In each beginning dwells inherent magic ...¹⁰

We've all seen it happen. A major reorganization is announced, its significance and logic are explained, and then everyday life catches up with us again, all that happens is a few trivial items are hung in different place, a predictable staff reshuffle is carried out and the bastions of power are reinforced again. A lot of organizational changes have gone into history as bogus in this way. It was clear that making the new Augsburg organization work was a unique opportunity to give a real sense of the intended fresh start. This would only work if the existing power structures were broken down and young talents given an opportunity. It was important to find enough people who could feel the magic

of the new beginning and draw on this inspiration to cope with the difficult implementation phase. Once again the question was: what will be the few principles that we apply to the reorganization process? Two principles remained:

1. All the management positions (over 100) will be advertised internally.
2. The application and appointment process will be carried out on the basis of clear criteria. Alongside specialist competence, motivation to make the new business model succeed is the key selection criterion.

Gerhard Bock remembers:

"Even though we had already invested a great deal of time and energy in workforce participation, a lot of people still thought the storm would pass them by. That attitude was shattered when it was announced that all the jobs would be re-advertised. That was the crunch point. I didn't shout it from the rooftops inside the firm, and most people who found out about it later said I was mad. It was certainly the bravest step in my career."¹¹

In not more than two month the jobs were all advertised, applications processed and new jobs allocated. The whole process was transparent, trouble was taken to identify possible losers and speak to them before the official announcement and explain how new things could be opening up for them. If it is badly executed, advertising all the key jobs can lead to a resigned and cynical attitude. In Augsburg the rapid, speedy process built up people's trust in the new model and convinced everyone that this time no empty promises were being made, and no bogus, feeble measures taken. This insight created something essential to the continuing process - commitment.

Intelligence distributed in Augsburg

There are plenty of examples of outstandingly good broad concepts that are courageously conceived, and persuasive in their logic, but that ultimately fail or trickle away into nothing. This is why it is essential to emphasize the importance of preparatory work, and that clear strategies must be formulated, then implemented compellingly and uncompromisingly. Many projects come to grief because of ingrained middle management behavior patterns and end in a cul-de-sac in which all that is left of the planned renewal process are new labels and different signs. The Augsburg project also repeatedly came close to dangers of this kind. Declarations of intention and fine words are not enough, every privilege must be questioned and competencies redefined, and that right down to the very bottom, so that there too - and precisely there - the workforce has a sense of confidence and personal commitment.

The first events in Augsburg, in which the third management tier was to be informed about the new business model ideas, had not achieved what they set out to, if examined critically. The participants had been informed, there were also appeals to support efforts to implement change unreservedly, the participants had even been asked by the plant director to make a written declaration on this head, and were obliged to do this. But none of this had been enough to change the skeptical attitude of the management members who had not been involved in the Action Lab, even though in the mean time a whole new sense of determination had developed in the project work, and this also resulted in a totally different communication style, marked by conflicts approached head-on and a passion for making progress.

But old, tried-and-tested methods had been used for the information meetings: the "Social Engineering" approach still dominated everything. In contrast with this, real participation had to go through three development stages building on each other, and these were fundamentally different from merely being informed and participating dutifully.

1. Shared understanding of the meaning and consequences of change. This means understanding the urgent need for change, the procedures, the framework devised and the concepts developed. But it also means revealing facts that had been kept secret hitherto, and not trying to make the situation look better than it is.

2. Commitment to successful implementation.

A second step is to develop the commitment of a critical mass of employees to own the new concepts and to successfully implement them in their area of responsibility.

3. Harnessing adversity by learning from prior mistakes. In Chapter 12 we introduced disciplines that anchor adaptive skills within an organization. One of these is harnessing adversity by learning from prior mistakes. This is crucial for the implementation phase of discontinuous change. It involves making people understand that there will be implementation crises and that they are the playing-field on which the success or failure of a project is decided. If accepted proactively, crises sharpen understanding and anchor it on the plane of action. The "heat" generated leads to the "unfreezing" of existing behavior patterns and thus the crisis fields become catalysts for the co-operation model that ensures continuing existence in the future.

Under the magnifying glass

Particular problems occurred at the beginning, when the first phase of the job of convincing people was supposed to be introduced. Two insights were reached as a result of the unsatisfactory experiences at the early information events, and these assisted progress.

1. We do not know how to develop real participation. The tried-and-tested methods are inadequate here.

2. Binding the workforce into the project is so important that we make it central to our work and have to find out how to make it work in our factory.

We advanced carefully, and concentrated in the third tier of management at first. The newly developed basic concept had to be conveyed to them, as they would have to be involved in the next stage, working out detail and putting the plans into practice. It had been decided that the whole management team and the project team would be bound into preparation and execution. Preparatory meetings in the individual departments, interviews with the workshop participants about their expectations and fears showed the preparation team the way they should go.

Expectations were justifiably low. Most events of this kind are actually not successful in the long term, and in the mean time everyone has learned to go along with the rhetorical rituals and come out of it looking good. Taboo subjects were revealing the real figures and the possibility of questioning the business model that had been devised.

The meetings were chaired by Peter Schwarz, an acknowledged expert whose unassuming ways and natural charm made him a credible exponent of the new model. To the participants' amazement, all the key figures were presented in the course of the event. Arguments about, for and against the new business model were violent and long-drawn-out. The middle management felt that they were being taken seriously for the first time. Thus the first phase - for the third

management tier at least - had been successfully concluded. There was enough mutual understanding to start on the implementation program.

The key step for making people commit to implementation was the way the reorganization described above was to be carried out.¹²

The third phase for creating real participation, mastering crises, always takes place in real time. It is possible to prepare for this by making people understand that no concept can describe the real situation, so that each time complex changes are introduced this will provoke crisis situations. Solving these is an essential part of adding detail to the concept. A series of mini-workshops investigated typical individual and collective behavior patterns in crisis situations of the kind that could occur in the implementation phase. Then the beginning of the hot implementation phase was nothing but crises: difficulties with installing the new software, failures to keep track of the supply situation, misunderstandings in the newly developed customer-supplier cascade.

The greatest crisis field came into being when on top of all this the factory director Gerhard Bock was promoted (despite being 60) and replaced by a new one. He came from an environment where central control and monitoring were crucially important and had great difficulty in adapting to the process that was already under way. He gave the impression that he would have preferred to turn the clock back and take the helm himself again. But it was too late for that. The team was busy coping with crises.

All those involved in this white-water ride - a metaphor that people liked using at the time, and frequently - still say they learned more about business, their colleagues, about management and about themselves in these crucial months than any course could have taught them.

¹ Martin Herrmann, interviews with leading EADS management figures, June 2002.

² Loc. cit.

³ Daimler Benz Aerospace annual report, 1995.

⁴ Martin Herrmann, conversation with Gerhard Bock, Juni 2002.

⁵ Martin Herrmann, interviews with leading EADS management figures, June 2002.

⁶ This section refers to the principal work by N.Elias, *Über den Prozeß der Zivilisation*, Suhrkamp 1997.

⁷ Martin Herrmann, interviews with leading EADS management figures, June 2002.

⁸ Mitchell Waldrop, *Complexity*, Simon & Schuster, New York 1992, pp. 220, 225-226

⁹ Martin Herrmann, interviews with leading EADS management figures, June 2002.

¹⁰ 'Und jedem Anfang wohnt ein Zauber inne ...' Hermann Hesse, *Die Gedichte*, Suhrkamp 1977.

¹¹ Martin Herrmann, conversation with Gerhard Bock, June 2002.

¹² Martin Herrmann, conversation with Peter Schwarz, June 2002.