5th Global Drucker Forum 2013
Managing Complexity
Vienna, 14-15 November 2013

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The embarrassment of complexity

1.

The embarrassment of complexity begins when we realize that old structures are no longer adequate and the new ones are not yet in place. Currently we are in a transition phase. The old never yields to the new in one precise moment in time and this is what makes transition phases exciting, risky – and sometimes embarrassing.

The sheer multiplication of networks of various kinds and the unprecedented density of interactions generated thereby has opened access to information and information sharing to a multitude of new users.

So has the spatial expansion of every type of activity around a rapidly globalizing world. And the flood of ever new technologies and the novel gadgets is proof that more can be done in less time.

As we joyfully engage in the benefits these developments bring, at times we also feel overwhelmed by a massive, unaddressable complexity that seems to come with them.

But neither technology is the cause of this feeling; nor globalization per se. Doing more things in less time – the division of labour – was at core of industrial revolution and has spurred management ever since.

The truth is that complex systems are beset and energized by a phenomenon called *non-linear dynamics*. In other words, what produces complexity is not so much the presence of many direct cause-effect links which operate with subtlety versus precision, but rather the presence of indirect, non-linear relationships between the variables, parts, and dimensions of the whole. What make complex systems so complex, therefore, are their multiple feedback loops and their indirect cause-effect relations which, moreover, play out at different speeds and on different time scales.

These are the reasons why we arrive at what I am calling "the embarrassment of complexity" – when it dawns on us that the categories we normally use to neatly

separate issues or problems fall far short of corresponding to the real world, with all its non-linear dynamical inter-linkages.
Worse, managers have to act *as if* they could look at the whole, when what they see is only a part. They have to act *as if* in command of the kind of integrative thinking that cuts across the separated issues.

So how do we cope with this increasing complexity? And how to embrace it?

Managers have developed models and mechanisms to reduce it. The fewer variables there are, the more direct the cause-effect relationships, the easier it becomes to make decisions. Thus, complexity reduction is a familiar way for any organization to cope with complexity.

But what, if these models and mechanisms no longer seem to suffice, as more and more issues escape any direct cause-effect link and, as hinted above, follow the unpredictable trajectories of non-linear dynamics?

And what, if we begin to recognize something that has made our embarrassment much more acute in the past decade. We have come to rely much – too much? – on instruments and tools that a dynamic information and communication technology sector, drawing on all the research that preceded and accompanies it, has bestowed on us. Computers and the modeling that can now be done through them have become indispensable for the financial sector and the real economy; for the military; for moving people, goods, and ideas across the globe. They permit us to collect, process, store, and transform the new precious raw material of our age: information.

But there is an indisputable downside to this growing digital reliance on what I call *numerical complexity reduction*: numbers, indicators and algorithms take on a life of their own. They acquire a *Eigendynamik* that nobody any more can control. And they have an additional, unintended consequence. The more numbers are introduced, the lower becomes the priority placed on training, cultivating, and rewarding independent human judgment. Yet, this is what must be retained if we hope to master the tools we have created instead of being mastered by them.

When decision-support tools become too powerful and ubiquitous, when continuous monitoring, benchmarking, ranking, and other performance technologies allow *governance by numbers* to take over, the human faculty of independent judgment takes a backseat. Don't get me wrong: of course, indicators, curves, algorithms, and the analyses based on them are vital. But all must still be interpreted. Figures speak for themselves only to those who understand how they have been constructed and in which context they are to be used.

Faced with the densely compressed information that numbers, algorithms, and indicators offer, managers increasingly tend to rely on what they suggest as

action to be taken – sometimes, as the financial crisis so dramatically demonstrated, to our great peril. Time-starved administrators, policymakers, and decision-makers grow less confident to challenge them. Even if they know all the *caveats,* flaws, and imperfections of these tools, they are overwhelmed by their apparent objectivity, availability, and time-saving utility.

Indeed, given this plethora of benefits, human subjective judgment begins to look like a quaint, if not obsolete, survival trait of human evolution.

And it's no wonder, then, that indicators and related numerical instruments take on a life of their own. Their promised utility seems beyond doubt: they *do* reduce complexity. Their power stems from their ability to make people perform in the way in which the goals of their performance have been set.

2.

There are positive sides to complexity. It allows us to glimpse connections that were hidden before our eyes – the famous wing of the butterfly that can cause a tornado brought it home to us. Some of these previously hidden interlinkages contain new opportunities of insights and knowledge waiting to be translated into action.

Also, the embarrassment of complexity should make us more humble. It should cautions us to be much more careful regarding the consequences of our actions and decisions. It shows us the limits of what we can predict, and the power of unintended consequences.

Where does this leave the well-honed capability to plan and to steer, if the future is prey to contingencies that we are not able to foresee? One of the unintended consequences is that, paradoxically, complexity makes it more difficult to attribute both credit and blame to individuals as well as to collectives.

Credit – as more and more creativity and performance is the result of genuinely shared practices and ideas. The younger generation is a generation of sharers. If self-organizing processes, bottom-up and emerging, unleash creative spurts at an unprecedented rate – what are the mechanism for assigning credit to individuals who continue to be motivated by receiving recognition, if the ultimate product of collective creativity is the genuine results of fertile collaboration?

Blame – as is becomes more difficult to locate where and which mistakes have been made. Numerical complexity reduction allows to hide behind the complexity of numbers. If hierarchies are flat and no visible strict line of command is any more in sight, who is responsible if something goes wrong? And all too often, procedures and rules take precedence over the outcomes they are set up to achieve.

In the 1990ies, the management literature was full of exhortations like ‚Make more mistakes and make them faster' as the best way forward to learn from mistakes.

Learning from mistakes that have been made is an arduous and sometimes long-term process with a complexity of its own. This is even more evident in times of the current financial and economic crisis. Mistakes, indeed grave mistakes, were made – but not by us. As social psychologists Carol Tavris and Elliot Aronson show in their book with the same title, we are all prone to solve the tension generated by *cognitive dissonance* through self-justification and blaming others. We can blame the economists, who can blame politicians who did not understand the fine points of their analysis; everyone can blame the deregulated forces of globalization; or China, Germany or the US Fed, or you name it.

Probably, we could also all agree that the system of world finance and its relation to the real economy has become too complex for anyone to manage. But who will take responsibility and for what? Who is willing to stand up and to admit that mistakes have been made - by us?

3.

Can the embarrassment of complexity lead to the emergence of new *ethos* adapted to and capable of coping with complexity?

Such an ethos would be based on the acknowledgement that complexity requires integrative thinking, the ability to see the world, a problem or a challenge from different perspectives.

As each perspective has an epistemic claim of its own, thinking them through requires to acknowledge their entangled relationship, even if we are far from understanding it. We are dealing with a system which at best offers only a ‚crude look at the whole' (Murray Gell-Mann). Reaching out across different domains and adopting different perspectives to achieve some kind of *synthesis, synergy,* perhaps even some kind of *synchronicity* in the ways we perceive, analyze and interpret the world – note that the term *‚syn'* in these words comes from the Greek for ‚together' – we begin to realize that we are part of dynamic complex systems. Any such system is open and evolving.

Open – towards an unknown and unpredictable future which is not deterministic but full of potential that we are far from grasping. Evolving – in the sense of diversity and variation continuously giving rise to new configurations which are selected and transformed depending on the specific features and contingencies of the fitness landscape in which this process occurs.

‚All the progress of human civilization' writes cosmologist Lee Smolin, ‚from the invention of the first tools to our nascent quantum technologies, is the result of the disciplined application of the imagination'.

So, let us apply our collective and individual imagination. Numerical complexity reduction alone will not suffice to cope with the increasing complexity. It has unintended consequences. It leads to a certain kind of conformity in thinking and in how people see and interpret the world. The ability to induce independent human judgment in young minds becomes ever rarer in our educational systems. Overwhelmed by the increasing reliance on computational instruments, our faculties to discern, to rise critical doubts, to judge between alternative interpretations, are devalued and they deteriorate.

Let me be clear: No human group can survive, let alone effectively cooperate, without being able to develop a shared outlook on the world which is the precondition for acting together. But it is also the case that social groups thrive by making room for plurality, dissenting voices, and different perspectives. This is why management continues to advocate diversity as integral part of any successful organization. This is why what I call *competent rebels* are needed everywhere: individuals who are able to combine the necessary professional capabilities with the fresh, challenging outlook required for progress. The code of an organization, remarks James March, can learn only from those who deviate from the code.

Confronted with the embarrassment of complexity and faced with the challenge of overcoming inter-domain complexity, let us remember that integrative thinking does not spring out of models, indicators, or computer graphs, unless we put it into them. It requires the ability to combine parts of the whole, however crudely, into an approximation of the look at the whole which we will never see entirely. It requires us to draw on the faculty of human judgment to focus on the smaller picture in order to comprehend the larger one. It requires a sense of being part of the whole. Perhaps, this is the beginning of an ethos of how to manage complexity.

Literature:

Lee Smolin (2013) *Time Reborn. From the Crisis in Physics to the Future of the Universe.* Boston-New York: Houghton Mifflin Harcourt.

Carol Tavris and Elliot Aronson (2007) *Mistakes Were Made (but not by me)*. *Why We Justify Foolish Beliefs, Bad Decisions, and Hurtful Acts.* New York: Houghton Mifflin Harcourt Publishing Company.