

***TREASURY OPERATIONS IN A MULTI-NATIONAL OIL COMPANY:  
DIALOGUE ON THE METHODOLOGY OF USING NATURAL  
EXPERIMENTS IN COMPLEX EVOLVING SYSTEMS***

In  
'COMPLEXITY THEORY AND THE MANAGEMENT OF NETWORKS'  
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PROF. EVE MITLETON-KELLY  
*London School of Economics & Open University*

DR. MARCUS SPEH BIRKENKRAHE  
*University of Auckland Business School*

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The authors of this dialogue explore how complexity thinking can be used to resolve anomalies where 'old economy' meets 'new economy'. As a prominent 'old economy' company, Shell is revisiting its approach to value creation in the changed economic environment. To illustrate the tensions and possible ways towards resolution, the pilot study project with Shell Treasury Operations is used. The LSE Complexity Group worked with Shell Treasury Operations, using part of a new methodology based on the principles of complexity, to investigate a recent reorganisation. This was a pilot project, leading to a new collaborative action research project, ICoSS (Integration of Complex Social Systems), funded by the EPSRC (Engineering and Physical Science Research Council), in which BT, Norwich Union and Rolls-Royce Marine are also involved. The paper is presented in the form of a largely improvised discussion on the platform. It incorporates elements of another common tension – namely between a complexity research group offering a method, and an industry partner, keen for immediately applicable solutions.

MSB: Eve, who are you?

EMK: Well, I'm Eve Mitleton-Kelly and I'm the Director of the Complexity Research Programme at the London School of Economics. I am also a Director and the Executive Coordinator of SOL-UK (London), which is the Society for Organisational Learning.

MSB: That sounds all very impressive. I am Marcus Speh Birkenkrahe and I'm the Knowledge Manager for Shell International, more specifically I operate within Shell Finance Services, or SFS, which is the group of mostly senior finance experts who are the core of a much larger group of finance professionals within Shell. Here are some data: Shell annual revenue is in excess of US\$ 230 billion, the company operates in over 140 countries, so there are a variety of tax and insurance issues, there's a large hard asset base ranging from oil platforms to tankers to fleets of cars to petrol stations which need to be insured. There's a huge risk management issue, there are many mergers and acquisitions or divestments across the Group every year, with several reaching very high valuations. So, there's a very rich finance activity ranging from very fast moving things to very slow moving things and for all that I provide knowledge management support.

EMK: I always wondered what that actually means, "knowledge management".

MSB: I assist the organisation with leveraging what, for this kind of group, arguably is the most important asset - their intellectual capital. And that reaches into the aspect of social capital, it reaches into behaviours, it touches sometimes also, but more rarely, on IT systems. For me, Knowledge Management really is concerned with the quality of human relationships and human infrastructure in organisations.

When you and I started talking, I think that's the background for our experiment, you were asking me, or asking Shell, to join a large new project that you were planning, and that is now called ICoSS, for Integrated Complex Social Systems, and that had quite a long lead phase. So I thought, is there something we could do between our discussions and the beginning of that project? And it emerged that you thought that any operation within finance services that was undergoing a reorganisation, might be a potential candidate to look at, and test the methodology within the Shell culture. So we came up with Treasury Operations, didn't we?

EMK: We did indeed. Now, it would help if you could give us some background on Shell as a whole and then tell us a little bit about Treasury Operations, just to provide some context.

MSB: Okay, I've already mentioned how large Shell is, but Shell essentially has a tripartite structure and a Corporate Centre, which contains the Board and a number of Advisors and also the Finance Director, the Controller, a number

of finance functions with a very small number of people and one of them is Treasury, looking at the cash flow, looking at current exchange issues, looking at loans, whenever somebody in Shell wants to create a new company etc. Below that Corporate Centre is a group of four, five or six, depending on the count, businesses. Four of these are very large businesses, the Exploration and Production business, which is concerned with finding oil and getting it out of the ground. The Oil Products business which is concerned with taking that oil, shipping it, refining it and selling it on as petrol or in various forms to customers. The Chemicals business that deals with by-products of the refined oil product and the Gas and Power business which deals with yet other products, natural resources. Then there is a group of smaller businesses that include Shell Capital, Shell Renewable which deals with renewable forms of energy and Shell Internet Works which deals with making money off Shell's assets using e-commerce, and then there is a third part, that's why I said tripartite, which is the Service organisations.

This whole machinery of Shell needs a number of services to run smoothly. There is comparatively little outsourced within Shell. So, the IT services, people services, HR etc. are part of a service group - a group of service companies. One of these service companies (and probably the most successful one in terms of their business model and their customer feedback and success) is Shell Finance Services and that's a core group of 500 people, which are part of a much larger group of 5,000 people, which are mostly deployed in the businesses. And within that group of 500, there is one department in Shell Finance Services, which is called Treasury Operations that serves the treasury needs of all of Shell. It is organised in three regional hubs in London, Houston and Singapore, with about 100 staff altogether. And that was the target group of our efforts in this first phase. Is that understandable?

EMK: Yes, that's fine. To carry on with that context, can you also tell us the kind of changes that have happened, the kind of restructuring that has gone through recently?

MSB: Yes, okay. The kind of changes, I'm not going to talk about Shell as a whole but Shell as an integrated oil company and that means that it integrates right across the whole value chain of oil and gas. And finance of course deals with another juice, money, which is another form of oil. Finance is also almost an integrated operation. Over the last four, five years, partly led by the need to save costs and consolidate operations, there has been a huge integration, integrative efforts within Shell at large and also at a smaller level within finance. The creation of Shell Finance Services is part of that process and, for Treasury specifically, the centralisation of Treasury Centres all around the world into one or a few major Treasury Centres is the immediate step. Now, that already happened a couple of years ago and once they did the

first attempt, they found that they didn't think they'd reached the optimal organisation. So, they embarked on a whole series of reorganisations and during one of these reorganisations we contacted them. I think that's what happened.

EMK: Who's the we and them?

MSB: We meaning myself as SFS Knowledge Manager and you as the LSE Complexity Group. So, if you want, outside change management experts, offering them the complexity method was a way of looking at themselves, but that's really your cue. But now it's your turn to say what is it you offered to do for them?

EMK: It's rather the other way around, the question that Shell had was 'how robust is the existing organisation?' because it had recently reorganised the Treasury Operations. What we tried to find out was, first of all, what were the underlying assumptions, which determined how decisions were made and the way people actually think within the organisation. Underlying assumptions help us to identify potential inhibitors and facilitators of what needed to happen. The second thing we tried to identify was dilemmas. These may appear as equally desirable but apparently contradictory objectives. Thirdly, we looked at the common themes; the things that interviewees kept mentioning without being prompted in any way. These often indicate current concerns and areas of interest.

MSB: So, that's quite general, it could be applied to any problem.

EMK: It can be applied to any problem because the essence of that part of the methodology is to try and reflect back to the organisation what we hear and see about who they are, how they go about their business and how they think because once they've got that appreciation, we can then build on that to create the enabling infrastructure that will help them to develop what it is they want to achieve.

The way that we approach it is that we look at what we call a 'natural experiment' and a natural experiment in this case is a part of an organisation that wants to change the way that they're relating and working, and this is very important that it is the organisation itself that wants to look at itself.

MSB: So, that is why it's a natural ....

EMK: That is why it is a natural experiment. It is not an experiment in the scientific sense where you're testing something; this is where the organisation itself wants to look at itself, wants to have itself reflected back and see how it can improve.

MSB: So experiment really is actually a misnomer because .....

EMK: In one sense, yes. But in another it is accurate, because they are experimenting with what they want to become.

MSB: Can you expand a bit on what 'the way they're relating and working' means?

EMK: What I mean is the way that people interact, communicate and work together - the 'way of relating' reflects the informal structure of the organisation and if this changes it could have significant implications on how work is done, how procedures and processes are undertaken. To use the language of complexity, when individual agents change their patterns of interaction a new structure *emerges*. This process may also affect the culture of that part of the organisation.

MSB: We had a number of possible experiments for choice and we chose Treasury Operations.

EMK: That's right and the methodology that we use in fact builds on this need to reflect back, to understand how the organisation works and functions and thinks, so that we can use that as a starting point to co-create the enabling infrastructure, by identifying the cultural, social and technical conditions that will facilitate X. X being whatever it is that the organisation wants to achieve, what that vision is in the future.

MSB: So, what was the methodology that you used here, can you describe and summarise that?

EMK: The methodology is quite a long process and the whole thing takes, or will take in the new ICoSS project, two years from the introduction of complexity to the full implementation of the infrastructure and the thing actually working fully. In the Treasury Operations pilot, we only applied the first part and concentrated it into only six months.

MSB: But it was not the whole methodology?

EMK: No, it was only a small part of it. It was just the very beginning. What I would like to do now, is to give an overview of the whole methodology and then I will go back and explain what we actually did in the pilot. Do you think that might be better?

MSB: Yes, because that will give us the overall picture.

EMK: Exactly. To begin with, the researchers meet some of the key people involved and discuss the background to that particular 'natural experiment'. This gives us some context and identifies one or two key questions or concerns. We explain the process and our business partner is then in a better position to identify potential interviewees, who will take part in Phase One. This phase includes (a) a set of semi-structured interviews, taking the key questions and concerns into account; (b) an introduction to the concepts of complex evolving systems; (c) analysis and presentation at a Reflect-Back workshop of the initial findings from the interviews; and (d) the identification of enabling conditions, that will facilitate the emergence of the new organisational form

MSB: But how can you do that if you don't know which organisational form will emerge yet? You'd have to be very much in the moment, and that contradicts the organisational desire for process design, rather than discovery.

EMK: I think, it isn't a matter of design, it's more a matter of emergence, of creating the conditions that will facilitate emergence. So, let me give you an example. If you want an organisation that will be very innovative and creative, you need to facilitate self-organisation, exploration of the space of possibilities, and so on. In the pilot study, we found no evidence of self-organisation. So, if Shell decided that's the way it wanted to develop, then it would need to understand why it is not facilitating self-organisation.

MSB: Maybe the term 'organisational form' is not necessarily the right one. You're really talking about conditions for organisational development, because when you think of organisational form you immediately think "what kind of form" and you want to address that form.

EMK: Yes, you're right.

MSB: You're talking about something ... how can I say it ... that's really the infrastructure, something that then enables various forms.

EMK: It isn't a specific one, yes.

MSB: But that requires and stimulates a kind of dialogue, which I think is good.

EMK: The accent is very much on co-creation.

MSB: (Laughs) Who creates with whom?

EMK: Collaboratively, the researchers with the business partners. It isn't a matter of the researchers identifying something and coming back and saying this is the solution.

MSB: So, they don't work as consultants.

EMK: We don't work as consultants.

MSB: You made that clear from the beginning. I think, if I may say, from a point of view of a business partner, that there is some discomfort with the fuzziness and the softness of the methodology because we're very much used to working with consultants. Here's the problem, the consultant comes up with a solution, we hate the solution but we still pay or we like some of the solution and throw most of it away, and then go to another consultant, get a similar solution. So, that's sort of the frustrating process. On the other hand, that's also the attraction of this process because it's very empowering, it feels like you're, at all times, in the driving seat but that may be very uncomfortable.

EMK: It is very uncomfortable but it is also likely to be much more robust and to be acceptable because of the co-creation process. At no point do you feel that something is imposed on you that you have to implement. It is more creating something together, understanding what the problems are, what if anything needs to change, but doing it willingly. There is never any imposition.

MSB: In terms of what actually happened, is there more about the methodology?

EMK: There is much more. In parallel with this data collection, analysis and feedback, we also organise complexity-thinking workshops. Now, ideally, that needs to happen very early on with the small team that we will be working with because the earlier they can start implementing some of the ideas, changing the thinking, the easier it will be for the final framework to actually be implemented. What I'm talking about here is that they need to start seeing the day-to-day problems from a complexity perspective. If this happens, then benefits start to flow early.

MSB: That reminds me actually of another method that we use quite a lot in Shell which is scenario planning, which is also not meant to provide you with a solution like a forecast, but it's sort of a series of buckets. If you want, it's always explained that way in buckets. So, as you do what you do every day, you have ways of sorting what you do and your actions and your choice in either of those two or three, typically two buckets, which are almost diametrically opposed or very different futures. So, as you go along, you get a feeling for how your present choices make your future.

EMK: Yes, but it does something much more powerful I think and that is it actually forces you to explore your space of possibilities as well as to explore

the consequences of taking those actions and it prepares you mentally for what might happen.

MSB: So, we have an interesting emergence here in our discussion which is that this method, scenario planning, and your method actually make contact at some deep level.

EMK: Yes, these methods have a lot in common.

MSB: This is quite interesting because that means it's probably partially responsible for why Shell's culture might be quite responsive to this method.

EMK: I like that and, in fact, at some point I want to explore much further the link between scenario planning and complexity because it just fits in so beautifully in terms of exploration.

MSB: You said that there was much more to the methodology. What else is there?

EMK: An important aspect of the methodology is that it uses both qualitative and quantitative tools and methods. I have described the interview process and the Reflect-Back workshop, which are based on in-depth interviews. We can also look at the preferences of individuals and teams, in the way that they make decisions, exchange information, create new ideas and how they implement them, etc. This is done through a tool called Landscape of the Mind (LoM) developed by Kate Hopkinson, which is based on an email questionnaire. Individual details are of course never given to anyone other than the person concerned. The findings are for whole groups.

MSB: So that is the qualitative part of the methodology.

EMK: Yes it is - we also work with an artist and he captures the key issues of the analysis or of a discussion in a picture that in turn acts as a catalyst for further discussion.

MSB: You said there were also quantitative tools, what are they?

EMK: They are agent-based-modelling (ABM) and the mapping of e-mail connectivity over a period of time, using a tool called NetMap developed by Prof. John Galloway.

MSB: How do you collect the data - do you have to do more interviews?

EMK: No, the data for the ABM is gathered through another email questionnaire while the data for NetMap only requires access to a server and we look only at the fact of exchange not at the content, which would raise a difficult ethical

issue. While on the subject, I would also like to say that all the data we collect is non-attributable. That is, we never name who said what or give details of individual answers.

MSB: I am familiar with ABM but not with Netmap. I assume however from your description that both show connectivity patterns.

EMK: That is it precisely. However they do not only show connectivity patterns but also identify 'lynchpins' or highly connected individuals or groups. If you are doing any kind of restructuring you certainly need to know about these individuals or groups.

MSB: But why do you use so many tools?

EMK: Because they triangulate the data and provide robust findings. But that is not the only reason. They each provide different but complementary information about the organisation. So when all the tools and methods are used you end up with a very rich and deep understanding of your organisation<sup>1</sup>. You can then use the findings as a strong basis for building the enabling infrastructure.

MSB: We have been talking about phase one; is there another phase?

EMK: Yes. To summarise, the end of phase one is the identification of the conditions for creating the enabling infrastructure; that is, the framework of social, cultural and technical conditions that will facilitate the emergence of the new organisational form. The second phase is the implementation and the testing of that infrastructure and that is where working with ICoSS and a number of business partners, is advantageous and beneficial, because the partners will support each other as well as getting support from the researchers.

MSB: For Shell, this seemed to be one of the attractions of joining your programme. As many global companies of large size, Shell is very focused on itself. With only so much time to spend, there are not many collaborations with business partners outside the oil & gas industry. It works along functional directions but not to increase something like learning or the ability to respond to a situation. It's not a common ...

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<sup>1</sup> Mitleton-Kelly E. 'Complexity Research - Approaches and Methods: The LSE Complexity Group Integrated Methodology' in Keskinen, A., Aaltonen, M. & Mitleton-Kelly, E. "Organisational Complexity" with Foreword by Stuart Kauffman, Scientific Papers 1/2003, TUTU Publications, Finland Futures Research Centre, Helsinki, Nov. 2003

EMK: No, and one of the dilemmas we had found was ....

MSB: In Treasury?

EMK: Yes, but that's broader than Treasury: 'Shell in the world' and 'Shell is the world'. Shell is so large that it is easy to mix up the two. This can lead to severe blind spots.

MSB: And examples of such a blind spot, where Shell has made enormous progress, are environmentally friendly operations, and political sensitivity. In the context of Treasury operations, this is relevant when we compare ourselves with the operations of professional financial services providers who are both partners and competitors to us. So yes, that's an interesting one. That's a good example of a dilemma.

EMK: Just to finish off – phase three, which runs in parallel with the other two phases and continues to the end of the third year, is the documentation of the process and the findings and their dissemination. This is interesting at two levels. First of all we will be looking at the research process at a meta-level. The researchers, business partners and advisors make a good natural experiment – we are exploring new ways of working and different ways of relating; and we want to capture this. The other level of course is to do with dissemination.

The project is funded by the EPSRC (Engineering & Physical Sciences Research Council) and as a Research Council it granted us all this money for the benefit of industry as a whole, not just for the few business partners and research team. We must therefore provide handbooks, write papers, make presentations, etc. to document and disseminate the findings; both the process and the outcomes.

MSB: Is this it?

EMK: Not quite! When the project ends in 3 years' time, we have to help exploit what we have learnt – so we have undertaken to set up a research-led 'consultancy' to help other organisations go through the process.

MSB: Now, what actually did you do with Treasury Operations proper?

EMK: We really only tested the very first part of it. We did the interviews, about 20 of them, across the whole department, including customers and one partner organisation outside Shell, a bank, which had a long-term relationship with Shell. We did that because it's important to see it from the different perspectives. We then analysed the interviews and to test our interpretation, at least two researchers analysed each interview.

MSB: Why was that?

EMK: Because the analysis is based on what we hear, what we interpret and therefore to have one other person, with a similar interpretation strengthens it. It means that it's not just a purely subjective one and then all the interviews were divided between three researchers. So, again we have cross testing of the readings.

MSB: But in terms of immersion, of preparation of the interviewees or the workshop participants, was there any preparation? Were they offered any introduction to complexity?

EMK: We made the offer several times, but it was not taken up.

MSB: Would you have thought that would have added to the value?

EMK: Yes, enormously.

MSB: Why is that?

EMK: Most of the interviewees showed a great interest in complexity and almost all of them, said they would welcome a workshop on complexity thinking.

MSB: But, do you think that the value of the interviews themselves would have been higher if they'd had exposure to it before?

EMK: No. But after the interviews we arranged a Reflect-Back workshop to feed back the results to all participants who had been involved. And I think the value of the workshop, when we reflected back the findings, would have been immensely improved if they'd already had been introduced to complexity-thinking beforehand, because they would have had some understanding of the principles of complex evolving systems within an organisational context<sup>2</sup>. They would then have seen the findings from a different perspective.

MSB: I agree. Before we started the pilot, if you remember, I brought one group to the LSE to hear you discuss those principles, they all felt that they had begun to understand what complexity was about and what it had to offer to organisations like Shell.

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<sup>2</sup> Mitleton-Kelly E. Chapter 2 '*Ten Principles of Complexity & Enabling Infrastructures*' in '*Complex Systems and Evolutionary Perspectives on Organisations: The Application of Complexity Theory to Organisations*' Elsevier 2003, ISBN: 0-08-043957-8

EMK: Yes I remember that when they arrived they were fairly neutral - just waiting to be convinced that their afternoon was not being wasted. By the end of the session they had changed their attitude and were very enthusiastic. Two of the people at that meeting subsequently proved of immense value and helped to organise all the interviews.

MSB: And the next step would have been workshops in order to identify the cultural, technical and social factors coming out of the analysis.

EMK: That's right, because that is where the co-creation part comes in. Something we did manage to do, however, was to provide them with a series of pictures by our resident artist that captured the main themes, dilemmas and assumptions.

MSB: They were very successful and totally unexpected. They worked well. When you entered the room you were surrounded by all these colourful pictures that actually captured a lot of what your organisation is about - and some things that we did not expect!

EMK: That was the intention - and an indication of how well it worked is that Shell has since asked Julian to capture their strategy discussions.

MSB: Something which I wanted to mention, and which we talked about earlier, is in the workshop itself in which I also participated, is that the leader of the department took an increasingly active role. So, he really, if you want, left the paradigm of the empowered group by owning the results and very much remaining the navigator, not just the sponsor and championing the process but actually by owning it, which if I remember had the result a little bit for the others like, oh he's going to take it on board, he's going to take it on and run with it. Now, it strikes me that this is very much in line with the existing culture - it's expected from a 'good leader' - but how does it relate to what you wanted to achieve?

EMK: I think that it would have worked better if we had worked with that head of section in advance of the workshop on a one to one basis. Then I think he would have offered his support and I think he would have gone a little bit further into the background and I think it would have been a lot more successful.

MSB: Which might still actually be possible, to be honest, because I remember I gave him an article the day after on 'Swarm Intelligence' that had been published in the Harvard Business Review incidentally, around the same time, and he came back to me and he said that he now started to begin to understand how these concepts lead to a very different style of management.

EMK: Exactly.

MSB: So, as you just said, that was obviously one of your big learnings. Another one was that there is still a lot of pressure in the organisation if you begin such a process to carry it on because, unless there is a very tangible result, people feel nothing has been achieved. Now, from my point of view, already having got the buy-in, having put almost half the department plus the leader through this short phase and having given them this exposure is, I think, a major achievement. The organisation feels they have done something out of the ordinary, something new. It's a bit like in psychotherapy, you know; the major work is not done in the sessions but between the sessions. So, this is undoubtedly acting on and working on in them. Because the method has been advertised and others have been told, the relative silo situation of the department is slowly being changed. We could of course have driven very hard at continuing to work with them and I'm not sure that, after what we have seen, that the culture is, at the moment, ready to take the next step at this point in time.

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