Seminar Notes On ‘Redirection’.

Abstract: David Lane develops a theory about how agents act, or fail to act, during a process of innovation. He introduces the key concepts of 'ontological commitment' and 'ontological uncertainty' and he asks what we mean by 'uncertainty' and how we might classify the different kinds. He also examines the role of 'stories' in the decision making process.

Enzo Badalotti traces the history of the Olivetti company from the multinational organisation of the 1980's and the subsequent separation into companies serving different market areas. He describes how the 'Office Products' division coped with radical change resulting in a new kind of management with different interaction patterns and information pathways.

(These notes constitute an edited version of the presentations and discussions. Because of sound recording difficulties, only the main presenters are referred to by name).

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The production and consumption of goods and services are rapidly expanding activities in the economy. The more things we have, the more things we generate. In other words there is a relationship between social interaction and the things people need and value. What we need to know is why the 'space' of artefacts keeps growing as it does and how things with new functionalities come into being. In short I want to talk about the process of innovation, not something like the production of a new breakfast cereal, but the cascade of changes in the 'space' of agents and the artefacts they produce. In particular I want to talk about the effect of what I call 'ontological uncertainty' in the innovation process

When people or firms are in the context of an innovation process, characterised by a cascade of changes, how do they as agents, act? As a case history I want to talk about a firm called Echelon which produced a distributive control artefact as a product. This was a Silicon Valley start-up about 13 years ago which launched a distributive control technology called 'Lonworks', described as a 'universal solution' to the problem of control. Every process designed to do something has to be controlled whether it involves artefacts or human beings. The idea started with a guy called Mike Markkula during the period when he was the C.E.O. of Apple. He was thinking about what was happening to the size and power of computers; the size was getting smaller and smaller and the power was getting larger and larger and the cost was getting less and less. So he asked himself what would happen when computers cost a dollar and they were the size of a little finger. The answer was that there would be a computer in everything, making it potentially 'intelligent' and artefacts could be networked so that they could communicate. If everything could have 'intelligence' built into it and be connected to everything else this could be a whole new kind of structure of artefact systems. Markkula got together some of the best engineers in Apple and said: 'design me a chip for such a communication system'. After three years Markkula set up Echelon and asked Ken Oshman, who had recently stepped down as CEO of the successful PBX (private telephone exchange) company ROLM, to run it. They raised about about $25 million in venture capital, and when the distributed control chip and communication protocol were developed, they set out to determine how to market the product.

At the time (1990) there were three control industries; one was “building automation,” primarily HVAC (heating, ventilation and air conditioning) but also beginning to consider potential synergies with other automated building systems, including lighting, security and elevator control. Secondly, there were factory controls, which basically controlled the factory floor flow of discrete events such as automobile or semiconductor production and again these involved completely different artefacts with different industrial infrastructure. And then there was process control, where liquid or granular solids were mixed or chemically reacted. This also had entirely separate systems of automatic control. Finally there was a big need in transportation for controlling such things as trains or cars by traffic lights and there was the big market that everybody had been dreaming about since the thirties which was the 'home' market. This was potentially very big indeed.

What Echelon thought they had found was the universal solution which would distribute control down to the level of smart sensors and smart activators by means of the communication system so that hierarchical control systems would no longer be necessary. The aim was therefore to revolutionise all these control industries so the sensors and activators were separate but the control systems would all be the same. The 'intelligence' would be

distributed at all different levels and all the potential applications that were out there not currently organised could be swept into the bag.

In the intervening years the dream has not been fully realised, though there are emergent markets for control systems out there which are organised around the Lonworks technology. There are many kinds of artefacts that have the chips embedded in them and all kinds of systems, 'closed' or 'open' that use this kind of distributed control technology. And there are also all kinds of firms offering services and what are called 'scaffolding' structures that support this industry including standards and trading organisations. The market system that developed involved what I have referred to as a cascade of changes which were slower than people anticipated both because penetrating the existing market systems was slow and because it involved deconstructing and reconstructing the structure of artifact space and of course the relationships amont the agents that made or used those artefacts. The existing systems had all kinds of inertial mechanisms built into them, necessitating the need for large cascades.

Echelon was composed entirely of Silicon Valley engineers. The established control companies with which they had to interact were all solid Midwestern corporations, with a very different in style and way of thinking. What did the Echelon people know about that world? And that's important. Thinking about any world, whether we're scientists or business people or just going about our normal human interrelationships, we act with respect to models that we construct of that world. I want to emphasise the term 'model' as an 'ontological commitment'. These 'ontological commitments' are basically our ways of populating the world which we inhabit and with which we interact. What I describe as an 'ontological commitment' assumes three elements:

1. A set of entities that populates the world.
2. These have modes of interacting amongst themselves.
3. There is an order in which these interactions take place (dynamics).
4. The effects, interaction by interaction, result both in changes in the entities and their modes of interaction.

It is the dynamics of the system that realises the model and what I want to claim is that without some idea of these we don't have any way of talking about or acting in our world. The problem is that all structures, from elementary particles, to cities, to market systems and even galaxies have dynamics which are changing all the time. If the structure of a world is changing then our ontological commitments better track the relevant changes and if that doesn't happen we commit what I call the 'fallacy of a time-independent ontology'. That's to say that we stay with our ontological commitments even though the requisite stability for our entities is not there over the time scale we are considering. This happens all the time in economics when we use equilibrium models. Component adjustment processes aren't a part of that. If we really want to have something like an 'efficient market hypothesis' then we need a long time unit so that short term adjustment processes don't matter. On the other hand people make money investing on the basis of 'tick by tick' information working on a time scale that is so short that we're only talking about adjustment processes and we're not talking about anything like equilibrium. That's an example where there's a mismatch between an entity assumption and the time scale of the process of interest. On the other hand evolutionary theory might make the assumption that the rules of the game can be regarded as fixed, whilst the strategies of agents change. But if the rules change almost as fast as strategies then again the fallacy of time independent ontology may be committed and if this is the case then we don't have entities or rules anymore that are invariant and we might as well forget what the theory is telling us.

One of the best stories that I know of a company committing the time independent ontology fallacy was a very successful business in the early 1980s making 'word processors'. Remember those? They were a very specialised piece of hardware with a lot of software inside and when the company was told that software running on a general purpose PC might pull that market away they didn't believe it, because the product was so good they believed there was no way you could make software running on a general purpose computer compete. And they were right, because current software running on the machines we have today still can't do as good a job. But you don't see them anymore and there are good reasons for that. Because they had developed such an effective way to make the hardware and software have such a fast and efficient functionality they couldn't see them becoming redundant.

So what happens to agents who don't commit this fallacy of time independent ontology? They know that their current ontological commitments are inadequate, but they also know that things are changing so fast that the consequences of the actions they have to take now are going to be mediated by interactions of agents and artefacts that don't as yet exist. It means they're in a world in which they have to act, though they know there's a mismatch between the natural time scales of the processes with which they're engaged and their current ontologies for entities and interactions. So how do they act? In order to understand that, it's important to think a bit harder about uncertainty. What kinds of uncertainty are there?

The first kind is 'truth uncertainty' – we have a well-defined proposition, we know what it means for it to be “true”, we just don’t know whether it is true or it is fale. That’s the domain of the 'theory of decisions' and all the other terms which economists do talk about, such as 'risk' or 'subjective' or 'objective' probabilities. Such concepts are all in the domain of truth uncertainty. Truth uncertainty is certainly important. There are lots of propositions that we would like to know whether they were true or not, but focusing on them often gets in the way of acting. We need to take a wider view of uncertainty as anything that gets in our way of building a simple map between everything that's happened to us in our past and where we go in the future as a function of the actions that we take in the extended present in which we act. Truth uncertainty is an important part of that but not all. If it were the only one I would be happy with current decision theory. If I could really list all the consequences of any act that I could take and could give a value to their probabilities and in some way their value or utility then I would act to maximise expected utility, or something much like it. There are problems with that, such as the degree of complication, combinatorial explosion and that sort of stuff. But there other kinds of uncertainty that beset agents in situations in which our economic actors may stand.

The second kind of uncertainty and this is a fundamental and very positive consideration, is semantic uncertainty. This is when there is some proposition which clearly, from past experience is relevant to what we should do in acting towards the future, but we don't really know what it means. There's a relatively trivial sense of this in what we call predicate uncertainty, in which we often use categories that aren't strict Boolean categories ('on or off ', 'yes or no'). A good example of that is when people spend hours trying to decide whether they love someone or not. I defy anybody to tell me what the proposition 'I love you' really means in terms of a truth value, but it does describe something which we can believe to be the case, a state of mind, or a relationship between two people that definitely will affect action. If you decide to act as though, or you feel you love somebody else, you act very differently towards them than if you decide that you don't. There are many such terms and one of the most interesting results for me from the psychology of the last fifteen or twenty years is

the conclusion that most of our predicates do not have the structure of a Boolean category where it is clear what is in and what is out. They are defined by exemplars and distance from exemplars. There's fuzziness around the boundaries and that is often very important. Fuzzy set theory is designed to get at this uncertainty. The reason why it's important is that those categories matter to us and they affect action so they're part of the map where everything we've experienced in the past affects what we're going to do in the future. The uncertainty is not about whether something is true or not, but about meaning.

However predicate uncertainty is much less important than the next kind of semantic uncertainty, which is ambiguity. Ambiguity, in the way I want to use it, is not something that happens in the head of a person, like love or a category that a person can manipulate and use because it is not well defined. Ambiguity is something that arises in a social discursive relationship between different actors and it arises when we discover that those with whom we are talking are using words in a different way from the way we are using them. What they're saying doesn't make sense if they're using concepts which aren't the same as ours. They don't track. Yet the discovery of ambiguity can be an absolutely essential element in the innovation process because it opens up semantic space that had previously been closed. It doesn't provide for a simple combination between two different interpretations but a space for something new. I think that semantic uncertainty as it emerges in a context of discursive relationships between agents is one of the most important elements in understanding the innovation process.

What I want to do is contrast ontological uncertainty with these other two kinds of uncertainty and say that it is a situation where we can't even formulate propositions, well-defined or not, because the relevant entities that would have to enter into these propositions as subjects and objects do not yet exist. We can see the ongoing processes of construction but we don't know what entities will emerge and take on “causative” importance. When agents do encounter entities that they have never encountered before, how do they deal with that given the ontological commitments that they've made and are living by?. How do they incorporate those new entities into their models of the world. I want to talk about two ways of dealing with ontological uncertainty. One is to bring the new element into the existing model even if the implications are not understood and that is often the most effective response. Forget about it and get certain. Because people who are certain can act and sometimes it's more important to act than to talk. But what do agents do when they know they are in a situation of ontological uncertainty and they haven't yet encountered the new artefacts or agents that they need to incorporate into their given interaction mode? How they act given that, is quite a different story. We can briefly discuss that but I definitely won't have time to develop the theory.

OK, the way I want to get at this issue is to describe a set of working assumptions about what an actor does cognitively in this kind of situation to incorporate the new entities. It will be assumptions about the cognitive and action processes of people when confronting a rapidly changing world. This is really a circular process, where I start with these assumptions which lead me to do a certain kind of empirical study and I then use that as a basis for justifying the working assumptions. Which may sound pretty circular but anything beyond that kind of circularity is asking too much of us. Myths about scientific method to one side.

The first assumption I call “action as reenactment,” and what I mean is that what people do is a function of what they have done before and also about what they have learned from their own experience and from the experiences of others. What we call 'novelty in action' arises from attempts to do what we've already done in situations that differ in key respects from those in which actions have been carried out in the past. The novelty is

interactional between a kind of behavioural pattern that we think is like what we've done before and a setting for action which is different. And that interaction generates a sequence of actions that are then different and these subsequently roll back and become the kind of actions that we've done before. So there's space for novelty, albeit a very restricted one. Since the world is always changing, so to some degree is the re-enacting.

The second assumption is that action is 'narratively embedded'. It is a statement about memory. What uncertainty is really all about is things which complicate the mapping process between everything that's ever happened to us, what we do now and what we should do about the future. When I say everything that has ever happened to us at the level of memory I mean both conscious memory and experiential memory which need not be conscious. What's happened to us is only going to affect what we do to the extent that our body or our mind remembers. Memory is a tremendous filter which depends on embedding the past in stories. What's a story? A story has a structure, a plot and a cast of characters. It is the plot which structures events among a subset of the cast of characters. These are structured temporally in terms of the character's intentions. And here I attribute intentions to both people and artefacts. You might wonder what I mean by the intention of an artefact, but we can hold that to one side for the moment. The other important feature of a story is that it has an ending . It concludes with a denouement. What classically happens in a denouement is that the fortunes and even the identities of the characters change from what they were when they came in. That loosely is what we mean by a narrative structure.

Is a story just an ontology run over period of time? Memories map onto the cast of characters which gives them a richer structure than just being an ontological commitment, because now they're imbued with intentionality or ways of acting. We then have the question of identity which we haven't talked about. So in a story the narrative becomes richer and the dynamics is not just the order in which interactions happen but where it all goes. It's got the causality embedded in and that carries the characters and their way of interacting as a function of their intentionalities and their identities.

Questioner 1: Is a narrative a run of the model?

David: That's a good way of talking about it. The model is already richer because there are all these attributions of intentionality and identity that weren't necessarily there before. Any theory has an ontological commitment. General equilibrium theory has an ontological commitment but it doesn't have any stories. What I'm claiming is that narrative embedding is a key process for our memories and there is a lot of psychological evidence that is consistent with this way of describing memory. It is this dynamics, not the ontological commitment, that wraps in a whole lot of things and gets you somewhere. It not only has intentionality built into the characters but they also have their directedness. This kind of model is important when we talk about agents acting in the face of ontological uncertainty.

Now you might say 'What about the theory of decision?'. Well here I'm going beyond just memory and saying that the narrative embedding determines the action. In the theory of decision that's not the case. We may refer to our memory bank to pull out aspects of stories and reconstruct them very differently. We may work out a list of consequences to get a measure of uncertainty and value, but in doing so we rip our stories apart. There may be different stories but as far as this particular thing is concerned the theory of decisions will treat them as the same. Very different from the logic I've been talking about here.

The way agents act according to my memory model is that they 'back into the future'. Different situations can be endowed by an actor with a similar narrative and actions in novel situations can be driven by remembered actions in previous situations with a similar narrative

structure. So what's mediating between past and future is a narrative that carries the embedding structure of a current situation. The current situation is embedded in a narrative structure and that narrative structure is taken from narrative that gives the structure to memory of things that have happened in the past. The difference is that they've had their denouement and this one hasn't. So backing into the future could not be more opposite than what the theory of decisions tells us because that evaluates projected future consequences from a set of explicitly evaluated action possibilities. What we're talking about here is actors essentially following a current of a given ongoing interaction stream that is taking them somewhere. What gives direction to that current is the narrative logic that the agent has supplied to the current situation on the basis of some identification with the past. Which means that the agent is actually looking backwards and by an act of narrative embedding he's swept into the future. And an interesting consequence of this thinking is that choice of decision is really a lot less important than it's made out to be, not only in economic theory but in most management theory as well. Narrative embedding produces an inevitability of action and in the kind of situation that I'm talking about that is often what's generating the action and so the agent isn't even aware of a choice. That's very different from thinking that all action is preceded by a structured choice situation.

Questioner 2: And presumably that would make a storyteller very powerful?

David: That's right. We're are all storytellers, but powerful stories embed powerfully.

Questioner 3: This reminds me of Confucius. Years ago Chinese children used to read the text without understanding what the characters meant but because it rhymed they remembered the whole book.

David: And that would generate their actions in the future? There's some very interesting literature which I have been trying to understand which attempts to develop a cognitive theory from day one and it asks the question about what is really the difference between us and the other primates. It's easy to make a superficial observation like 'It's language', but where do we get that from? One of the key claims is that learning starts with imitation in which a child embeds rote memorisation of actions that then become verbalised and later get instantiated with meaning. That kind of behaviour does not seem to exist in any other animal species. Anybody who has raised a child has probably seen that when they begin to talk they don't know what they are talking about and that's particularly the case with songs. The meaning comes later. How do we learn something as complicated as syntax? Chomsky made the simple move of saying that's it's all in the head but he didn't say how it got in the head. The narrative is learned by story form in action.

The next point I want to make is that in backing into the future, the future is, in some way or to some extent, fixed, given everything else. But now I want to say that the past is plastic. What do I mean by that? Well stories don't always turn out the way we expect and narrative interpretations of interaction streams change in midcourse. I want to claim that they do change and in many cases totally unconsciously. In the context of repeated interviews when people are recounting what went on or even is going on we can get stories that change over a few months and the teller is totally unaware of it. Which is not something that I would have thought existed a priori. Going back to love again, how quickly we construct a story of a broken love affair in which the relationship becomes an inevitable outcome that we should have seen from the start. Several months before the critical events the story of the

relationship has none of these element at all. And yet we're happy (of course, in different time periods!) with both stories.

Questioner 4 : My experience of doing interviews is that if you ask people a question about something they never answer the main story of it. It's the process of asking the question that forces them to make a story.

David: That's a very interesting and complicated issue. If we want to empirically check any of these things how would we do it? We listen to the stories people tell, and what you're saying is: 'Well the stories people tell are in the context of a social situation in which stories are called for'. And then the question is: 'What do those have to do with what's in a head'. What I want to claim is that your point is methodologically important, but my working assumption is that those stories are there and until they become verbal in some social context they don't get out and that the very act of their getting out also changes their form. Reflection changes the story and that we can know by the observation of people in the course of interaction when they're facing redirection. When they're actually doing something; generating the actions that change the way they've thought about the line of action that they've carried out before. If you watch them you hear them telling stories. The stories aren't whole.

One example of that which I have observed in the Echelon story was a 180 degree turn around in what was regarded as the strategic line of the company which didn't come about because the relevant actor had constructed a whole new story. Narrative embedding is not the same as developing a new story. It may involve the existence of a cast of characters, some of which match with previous circumstances which need not be at all worked out in detail. How many times when novelists are interviewed they say: 'Well I had the characters and they themselves ran away with the story. They did it'. That's narrative invention; when the characters can write their own story. And that's what I claim is taking place. Not that stories are pre-formed and a whole story is in the head.

Questioner 5: Are you suggesting that we may be somehow hardwired?

David: No, memory is recreated. And what makes it constructed in particular patterns is the set of temporal connections that are narrative embedded. Memory is not about things just stored in pigeon holes. We know memory is reconstruction but we also know that it's reconstruction according to chains of activations. And we also know that the critical structure is the event and the tie between that and other events. So temporality is critical in our memory. I don't believe in introspection as much as the late 19th century introspectionists but I do believe it a lot more than some current experimental psychologists. If you try to remember something, you remember by a chain of connections that never wipe out the past, but these come in as temporally linked activation patterns. If we ask: 'What can get embedded in that system?', the answer is 'only things that fit well enough with the other things, so that they will mutually activate in remembered temporal sequences. That's why the narrative form is the critical form. If it sounded as if I was implying that these things are stored in boxes that cannot be the case because some things stay and other things go. There are all these criss-cross activation patterns.

Bertrand Russell once said that he was cycling along when it suddenly struck him that he no longer loved his wife and he turned his bike around and pedalled back to inform his present wife that he no longer loved her. This is the madness of a person who believes in rationality so much that he cannot see the narrative embedding that's brought him to that

point. What I'm claiming is that it is plastic. Being in love is not a set of propositions. We might experience change and we might come to see that change suddenly, though rarely with quite the coldness that Russell describes. They are situations in which there is a stream of past and a set of possible futures and one activation change causes a switch from one direction to another.

Because memory is so reconstructive we often cannot remember an interview or a storytelling episode about where we were three months ago because now we have another account and though we think it's where we were, it's totally different. We don't see the changes. Memory is doing the work for us. The activation pathways have changed though what's being reconstructed now doesn't mean that all the other ones are completely dead. They may be dead for this moment of embedding, but the events will be retained for much longer. It is however true to say that most of the events which we have experienced in our lives are not available to us now in any form. What I claim is that the ones that are, are ones that have been reconstructed, narratively re-enacted in temporal sequences. Events that don't get embedded into a story don't stay long in memory so they don't get involved in future action.

Stories lead to events. The fact that we have created a story at some level which may be just neural activation or discursive rendering can lead to events in our story which never happened, because the process of embedding may sweep in a lot of things that make our line of action credible. The fact that in this reconstruction process we don't now know the real experience anymore, means we go along for the narrative ride, but it also means there is much more coherence. Narrative logic enables the actors to know much more than they ever could observe directly, which permits them to take future actions rectified by the logic of their stories with a lot more confidence than they would have if they were Russelian rationalists relying on some kind of formalisable logic instead of the sense that the story makes of the events.

At the same time, actor's experiences to some extent depend on the interpretations that are framed by the narrative logic. So stories have a tendency to produce events which are concordant with those stories though of course there are limits. And the last assumption that I wish to emphasise is that narrative structure is social. Actors may make their own points in the details based on their own experiences but what they learn from other people in the form of memory artefacts like books etc., is formative. Stories conform to abstract narrative structures, plot forms and character types which are mostly inherited from an active society. The number of people who tell new stories which are mind-setting in any given generation is maybe one or two. We don't have that many Shakespeares for example and such an abstract narrative structure will get instantiated at all kinds of levels.

One of the things that my research showed was that Silicon Valley stories are very different from the stories in other industrial areas. I work in the centre of an industrial district, Modena, which has the highest number of entrepreneurs per capita perhaps in the world, some of which are quite rich, but none of them have any stories that involve their companies getting really big – the dream of most Silicon Valley entrepreneurs. So we're often talking about something quite local when we talk about social framework.

Questioner 6 : Is this theory in contrast to some of the cognitive science theories of people like Andy Clarke who would probably agree with some sort of inductive narrative reasoning as a default mode of behaviour, but there's kind of a trade-off with a more formal kind of rationalisation.

David : Andy Clarke is a very interesting philosopher of psychology and what I'm saying is resonant with his book *Being There*, but not limited to or a subset of it. A lot of what he says

could deepen an understanding of what I'm saying, but I'm talking in particular about action in the face of ontological uncertainty. It is ontological uncertainty that is driving here and not truth uncertainty.

I want to now finish the Echelon story. By 1996 the Lonworks technology was well on its way to being a success in the HVAC world, but control products for building automation were dominated by three major companies and a whole lot of little ones whose systems were based on what was basically a 386 computer dressed up with a lot of input and output. This was a hierarchical architecture attached to big heating and air conditioning units. Because Echelon was relatively small it had to work with the big control companies but with the support of some of the smaller companies worked to make the control architecture much more decentralised involving a fundamental control hooked up to a subset of smaller terminal units that could communicate amongst themselves.

Though Lonworks was working at higher and higher levels, in the process the dominating companies neither wanted to give up their 386 machines nor lose ownership of particular units, largely because of the service contracts. The reality is that once a system is decentralised and you have anybody's X connected to anybody's Y then basically it's disputable about who owns the system. Oshman wanted to build a company quickly, but dealing with the large established companies was like 'pushing on a rope'. However Echelon had hired a person from a big electrical contractor to whom the term 'system integrator' simply meant designing and installing a particular system for a particular client. So he was really talking a different language. Oshman's idea of a 'system integrator' was something that went beyond the control of information to something like facility management. Lonworks could certainly do that and so Echelon aimed to sell this idea to the big control companies. However because the person Echelon hired had a particular conception of what a system integrator was he began talking to a contractor who had been frustrated when trying to bid a LonWorks system against the big control companies because he couldn't get enough LonWorks compatible devices and subsystems to build the system required. The Echelon salesman and the controls contractor figured that an input-output device could be produced that would fool any device into acting like a LonWorks node. It would thus take information from elsewhere in the system and tell the subsystem what to do in a language it understood. Oshman was keen to encourage this, though he sign-on completey until he met some of these small controls contractor 'system integrators' -- and recognised in them the "independent PBX distributors" that had been ROLM's key distribution channel and allowed it to take on the giants AT&T and Northern Telecom and win. Here was a way of selling to big business through independent distributors – the ROLM story retold (and relived), with the controls contractors system integrators in the role of the independent PBX distributors. The new story changed the identity of almost all the players in Echelon's involvement with the HVAC market systems – Echelon itself went from a "technology company" to a "control systems provider", and the big HVAC control companies changed from valued clients to the competitors' role that AT&T and Northern Telecom had assumed in the ROLM story.

Was this new story fully worked out in Oshman's head at the moment in which he "recognized" the control contractor system integrators as the old ROLM independent distributors? Probably not, but what's interesting is that a single character identification induced an entirely coherent story, which worked itself through attributions and action: Oshman's frustration vanished and he saw the future. This initiated a one hundred an eighty degree turn around in the company's strategy though many people in the company who had to act out the new scenario were not convinced. So there was a cascade of changes inside and outside the company. All kinds of things happened because of the cognitive shift; the

denouement changed and the redirection produced all kinds of dissonance at lower levels in the company – in the end, within a year, this story too was abandoned, and new narratives took its place in guiding the actions of the company. However given the CEO's narrative embedding, in the presence of ontological uncertainty, the redirection happened – and had to happen; even though the story didn't turn out according to the narrative logic that induced it.

In the face of ontological uncertainty, almost all actions involve a redirection at some level, though most of the paths do not lead anywhere. There are all kinds of stories at all kinds of levels; from a particular controls contractor interacting with a particular Echelon sales man, to a particular marketing person for Echelon interacting with a particular client company, to Echelon interacting with the big control companies, to the establishment of market system scaffolding structures like the annual LonWorld trade fair or the LonMark standards association. The process of redirection that keeps agents on track is one which has an almost fractal like structure.