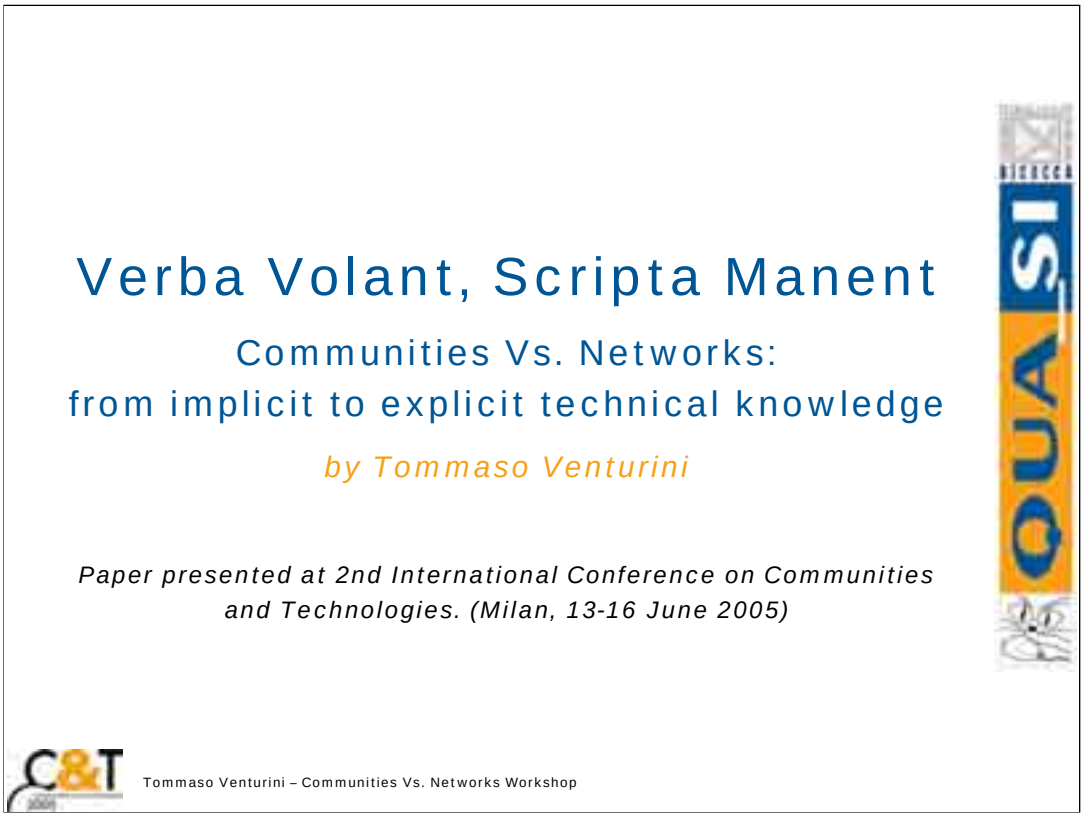
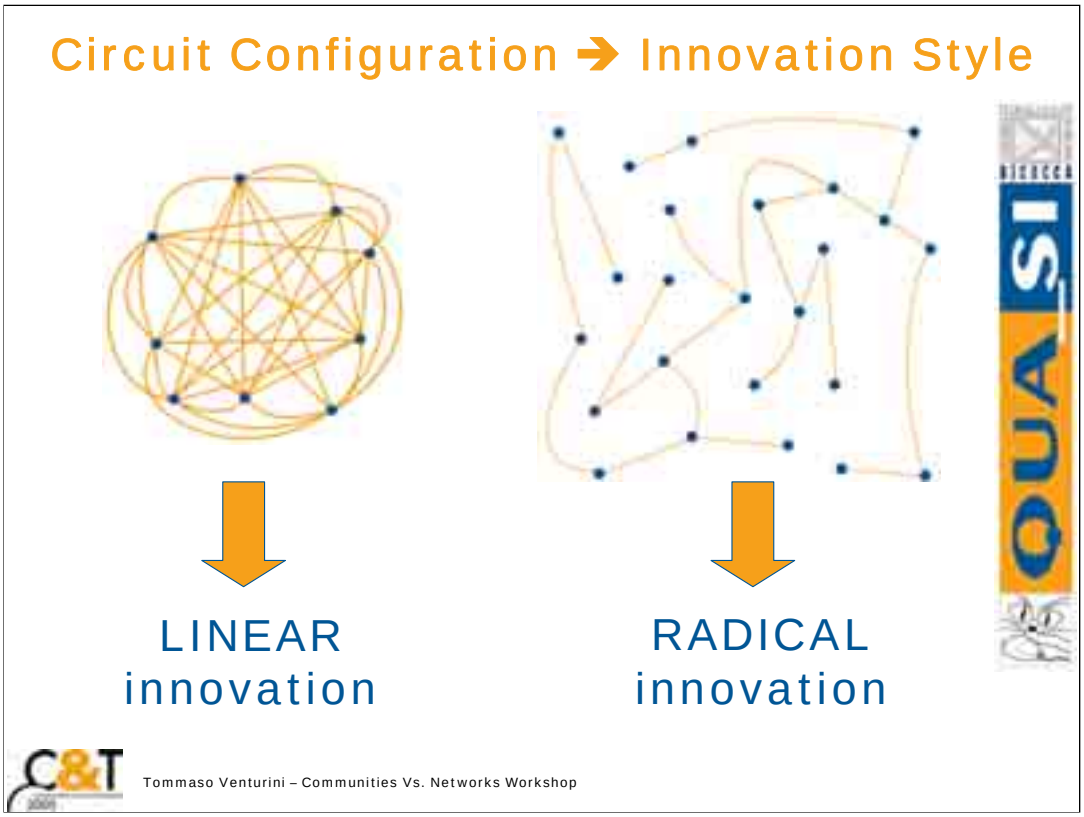


What is most interesting about this workshop is the idea of linking innovation to the circulation of knowledge.

Rather than seeing innovation as something that originate **inside** the mind of some inventor or inside an inventive organization, we are trying to look at innovation as something that originates **through** something. Precisely, through the relations that connect different individuals and groups.

Innovation, in other words, does not come from the accumulation of knowledge, but from the **circulation** of knowledge.



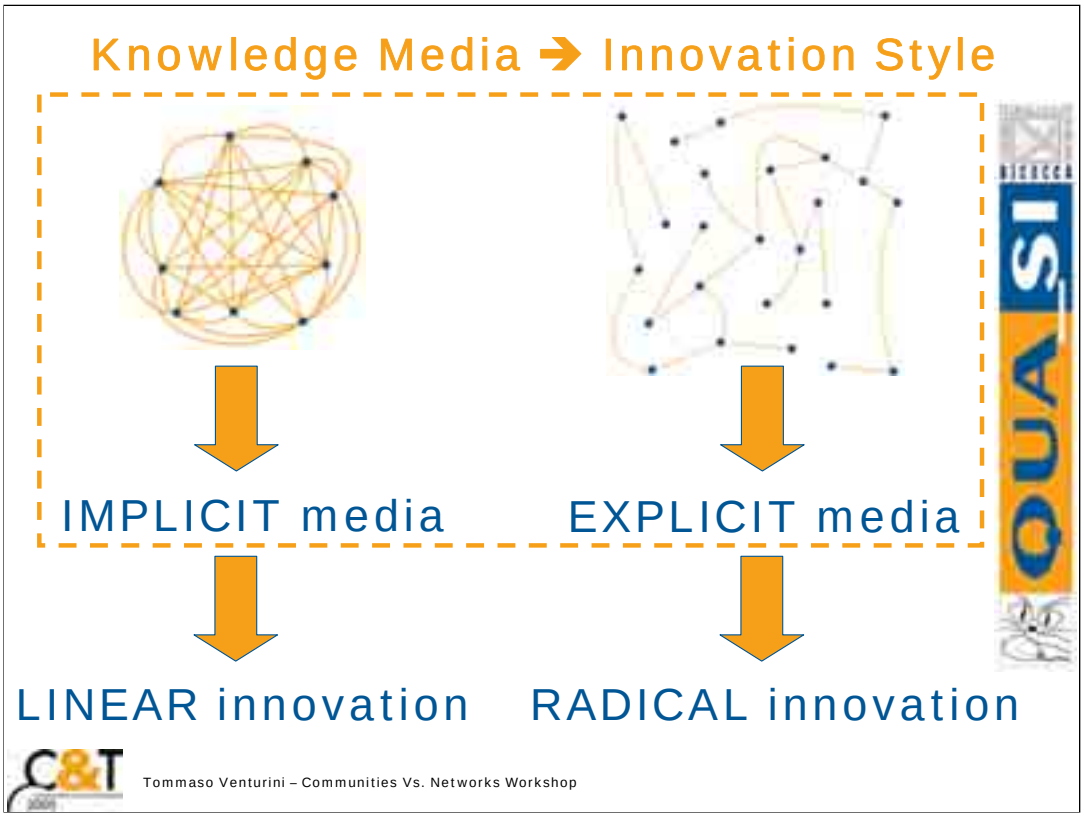
The main implication of this idea which has been discussed in many of the previous contribution is that different configuration in knowledge circuits produce different innovation styles.

Communities, which are circuits of few, strong, homogeneous social links tend to produce linear innovation

as they offer the perfect setting to rework the same problems and solutions over and over.

Networks, which are circuits of many, weak, diverse social links tend to produce radical innovation

as they favor radically new combinations of knowledge.



In my contribution I will suggest a second junction between knowledge circuits and innovation style.

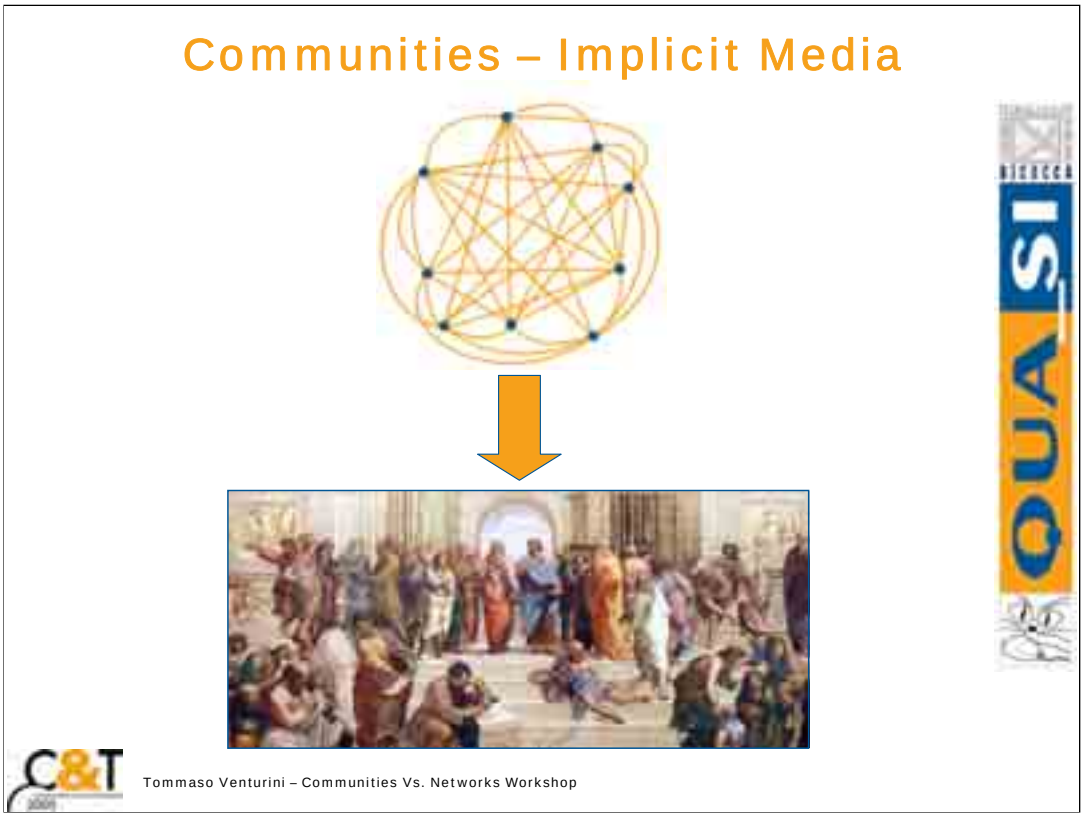
Innovation, I will claim, is influenced not only by the configuration of knowledge, but also by the nature of the media that mediates its circulation.

In other words, I will claim:

First, that communities and networks tend to be linked respectively to implicit and explicit forms of technical knowledge and,

Second, that these differences in explicitness tend to produce dissimilar types of innovation.

The first part of my argument is the easiest. Since communities and networks are so structurally diverse, it is not surprising that they tend to be associated with different means of communication

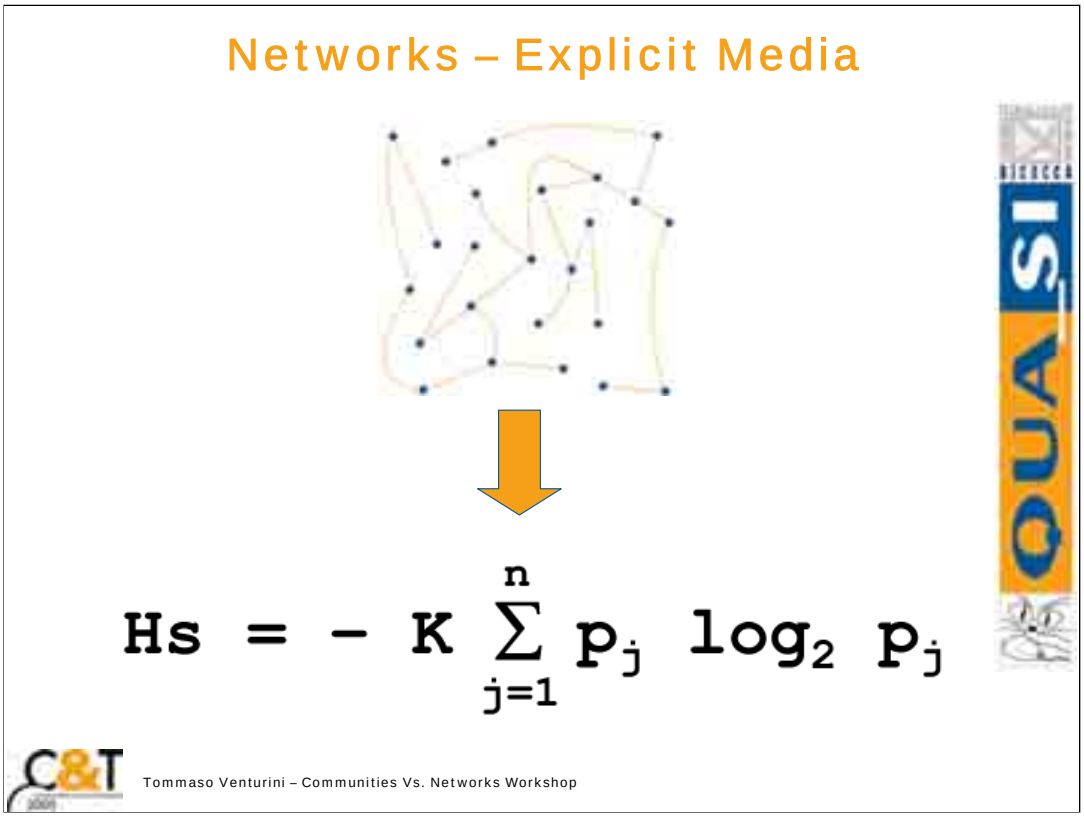


Communities, being relatively homogeneous, can take much of their culture for granted.

As their members rely on shared semantics, communitarian interactions lean towards implicit and situated forms of communication, typically face to face oral contact,

as you can in the School of Athene, one of the earliest and most exclusive scientific community.

To understand how explicit forms of communication would come amiss in communitarian interactions, thinks of the famous **Garfinkel** experiment on **indexicality**.



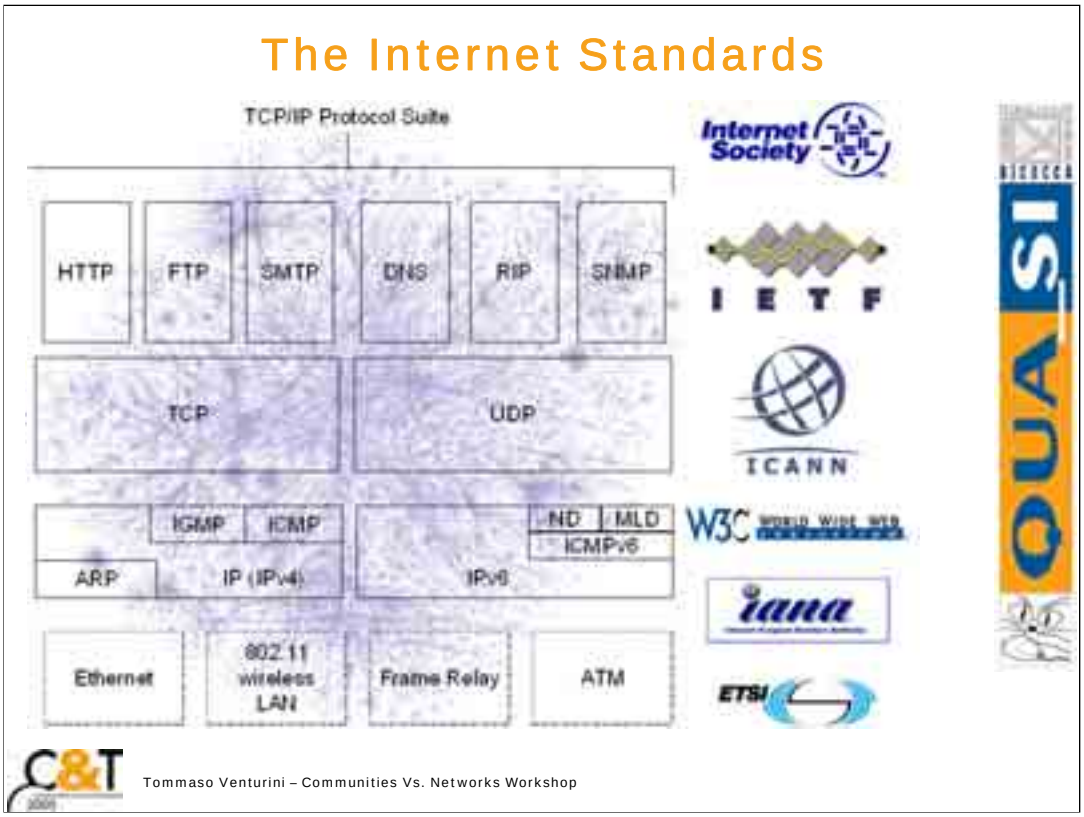
Networks, on the contrary, require explicit and formal languages to relate individuals with divergent social backgrounds.

Without context-autonomous media, large social networks would be impossible (at least from the organizational viewpoint).

Without the invention of ideographs, *for instance*, the administration of ancient Asian empires would have been impossible. Likewise, without national languages, the rise of modern, bureaucratic state would have been much more difficult.

In the slide you can see an equation of the famous **Shannon information theory**. One of the most sophisticated attempt to develop a mathematical (and thereby universal) formalization of information.

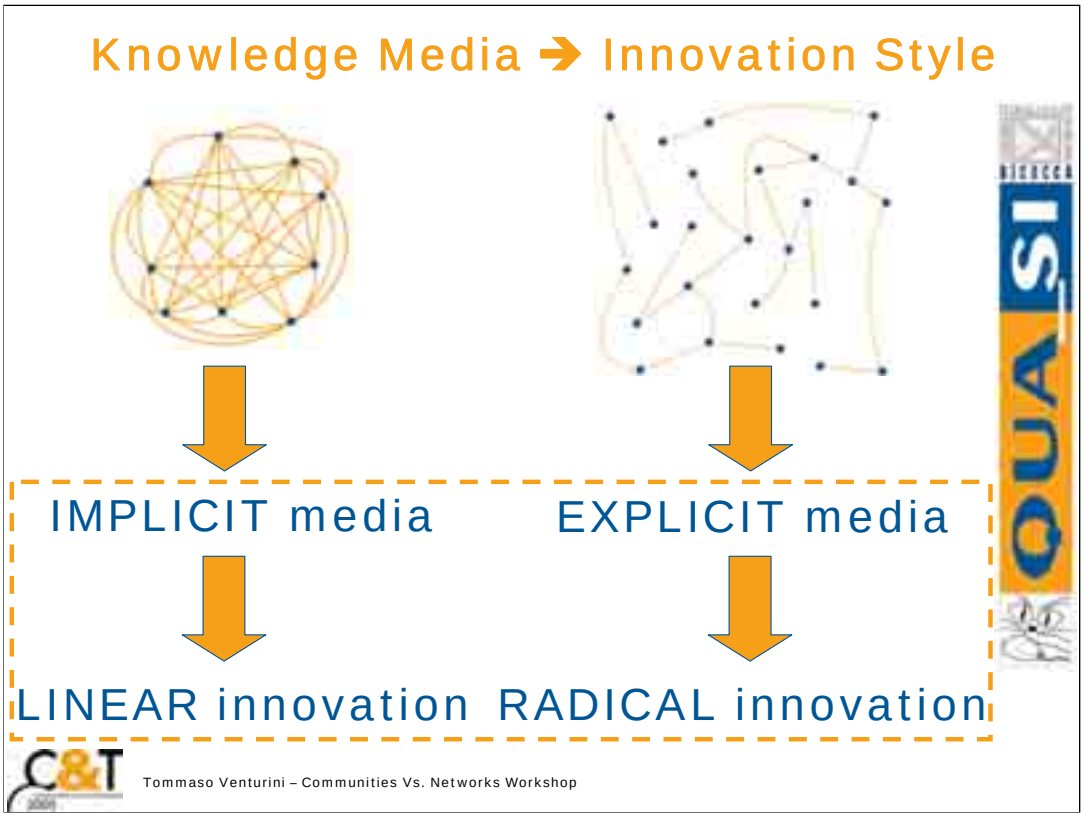
(This equation provides a measure of the disorder or ignorance that may exist in a quantity of information)



Networks call for explicitness and standardization.

Think, for instance, about the huge energy which is constantly dedicated to define and spread the standards of **Internet**.

This is the Internet and here you can see the protocols on which it is based and some of the institutions that work on them.



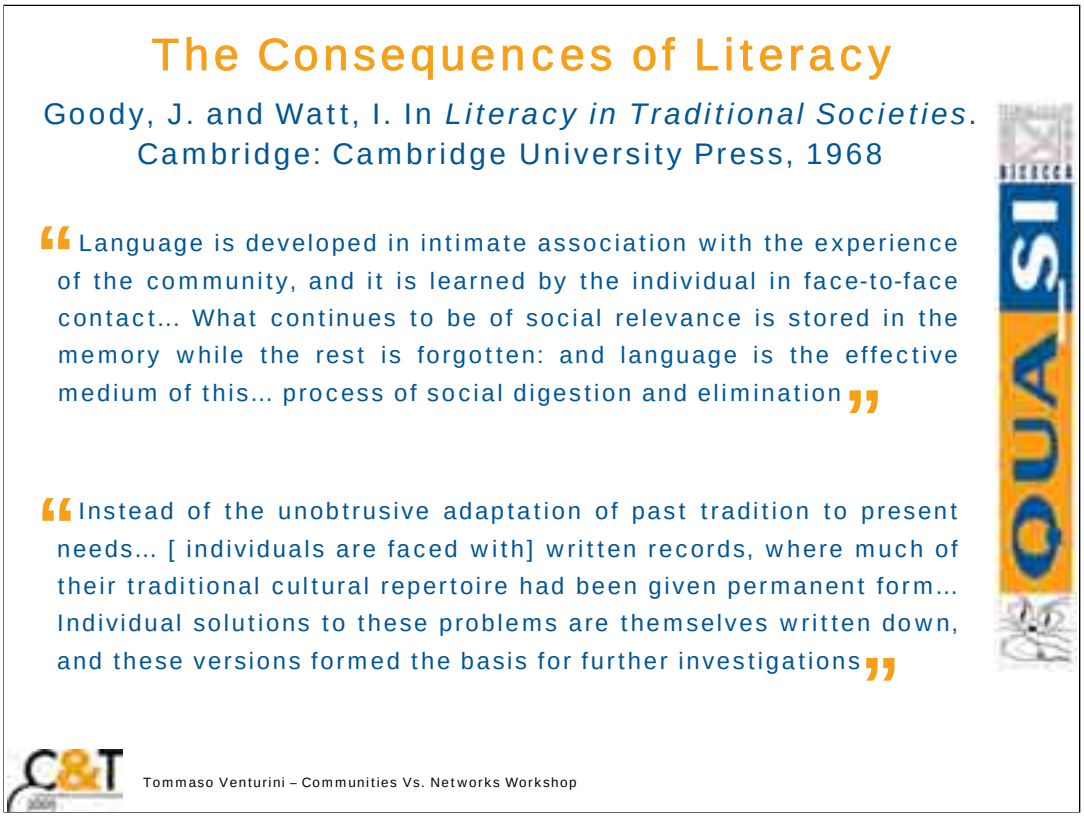
Obviously, I'm proposing a **broad generalization**. I am aware that not every communitarian communication is implicit. As well as I know that not every network is made by explicit communication.

Still, I believe that this distinction has some heuristic value.

This value has been demonstrated in cultural anthropology by authors, such as Jack Goody, Ian Watt, Walter Ong and Elisabeth Eisenstein, who compared the development of culture in oral and alphabetical society.

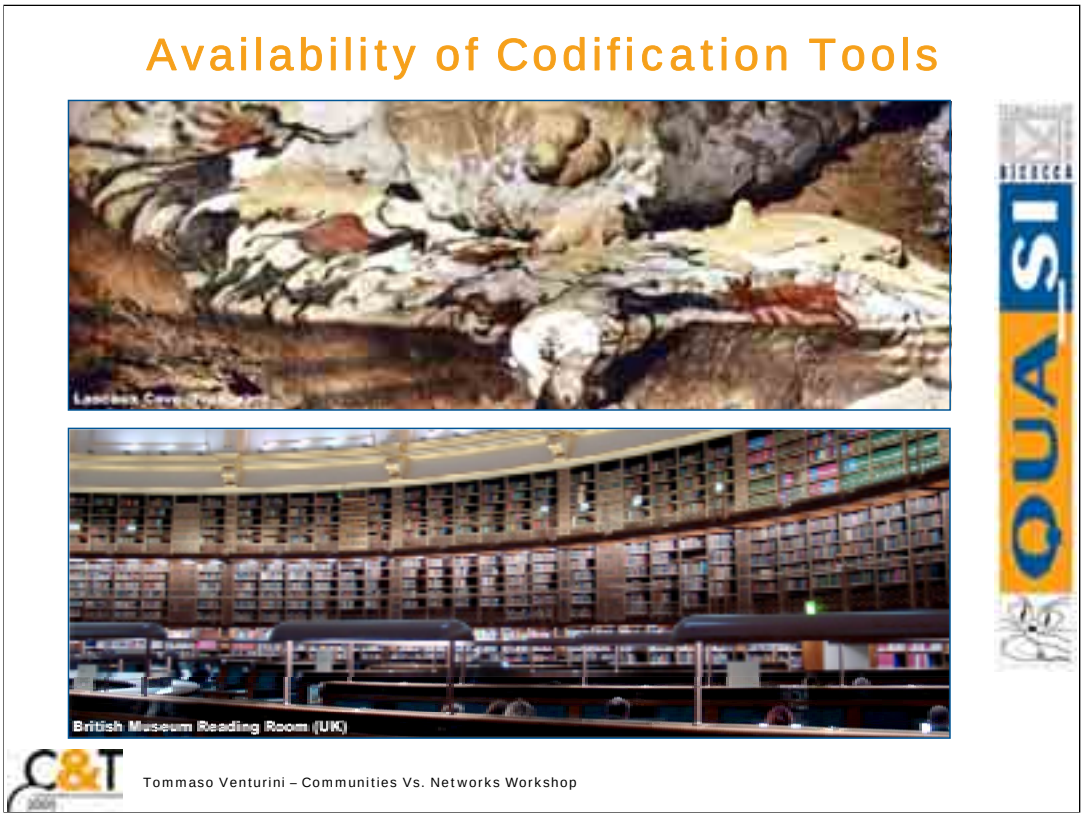
These authors demonstrated that many of the differences between traditional and modern societies are to be attributed to the different media available to their members.

This claim sheds light on the **second part** of my argument:
implicit and explicit media promote different style of innovation.



According to Goody and Watt, **oral communities** tend to develop in a linear way, because they rely on implicit and embodied means of communication. As their tradition is stored in individual memories and transmitted through face to face encounters, oral cultures are always open to transformation**…**

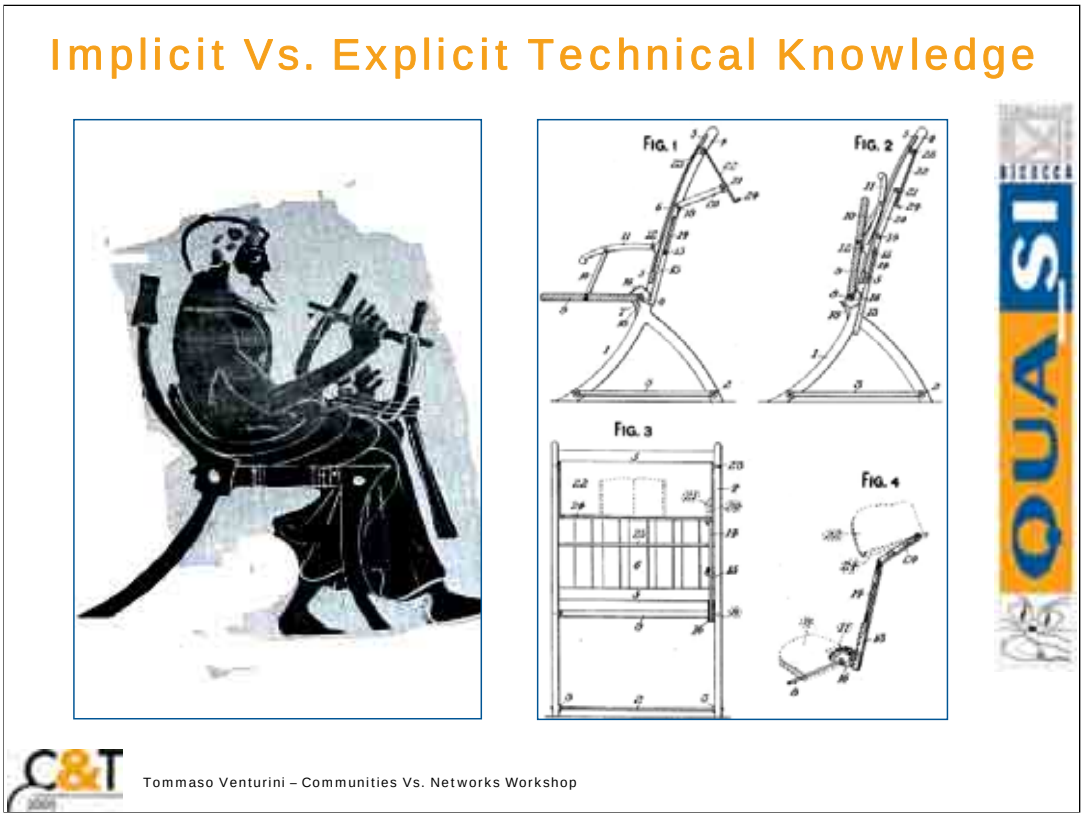
On the other hand, **networks** that use explicitly and materially inscribed languages are constantly confronted with transcribed and thus fixed documentations**…**



To sum up:

Oral and implicit communities, which have few tools to fix their culture, tend to develop through a continuous and gradual renovation.

Alphabetical and explicit networks, which have many codifications tools (think of libraries, scientific reviews, museums, databases and so on and on), tend to develop through succeeding stasis and revolutions.



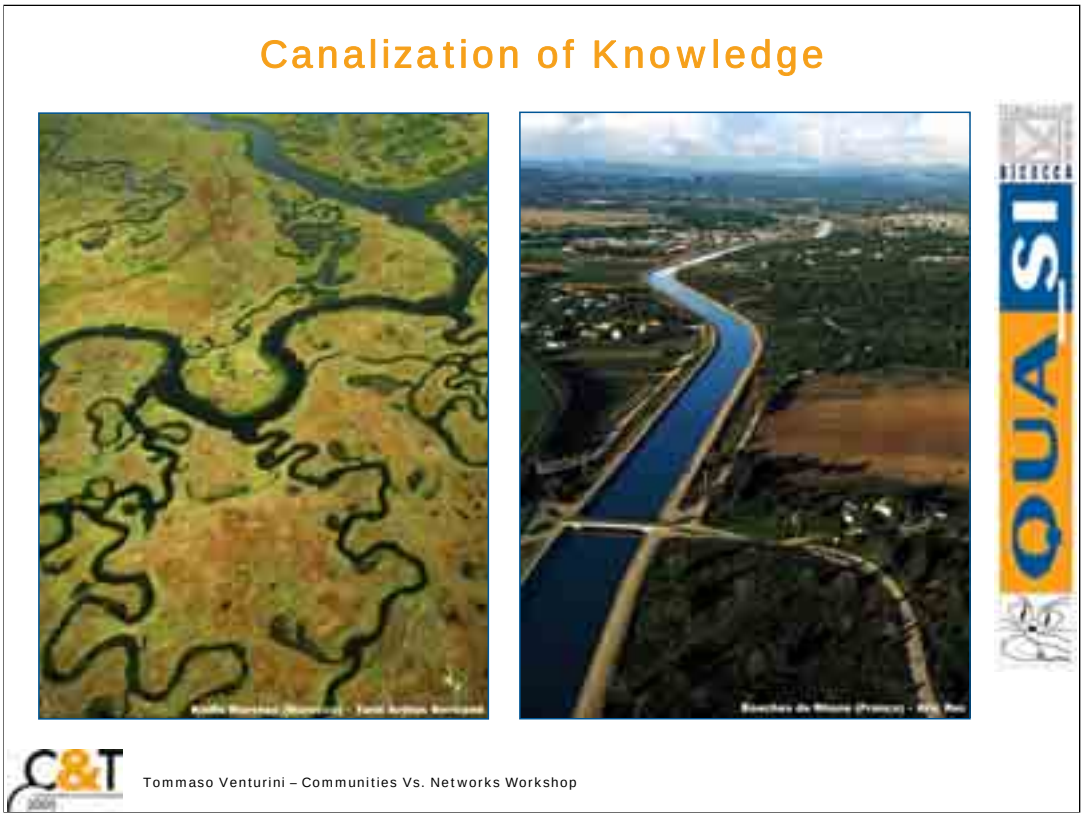
The same reasoning can be translated in sociology of technology.

As long as the design of technical artefacts is reproduced mainly through use and imitation, the development of technology will be constant and linear, since every reproduction is a potential renovation

On the contrary, when the form and function of every technical device is recorded, measured and codified to the last detail, then innovation take a different rhythm.

Explicit media, favouring the dissemination of technical knowledge, stimulate the creation of new ideas. At the same time, standardization generates a strong resistance to change.

This **double bind** produce an intermittent development, made of discontinuous and radical innovations.

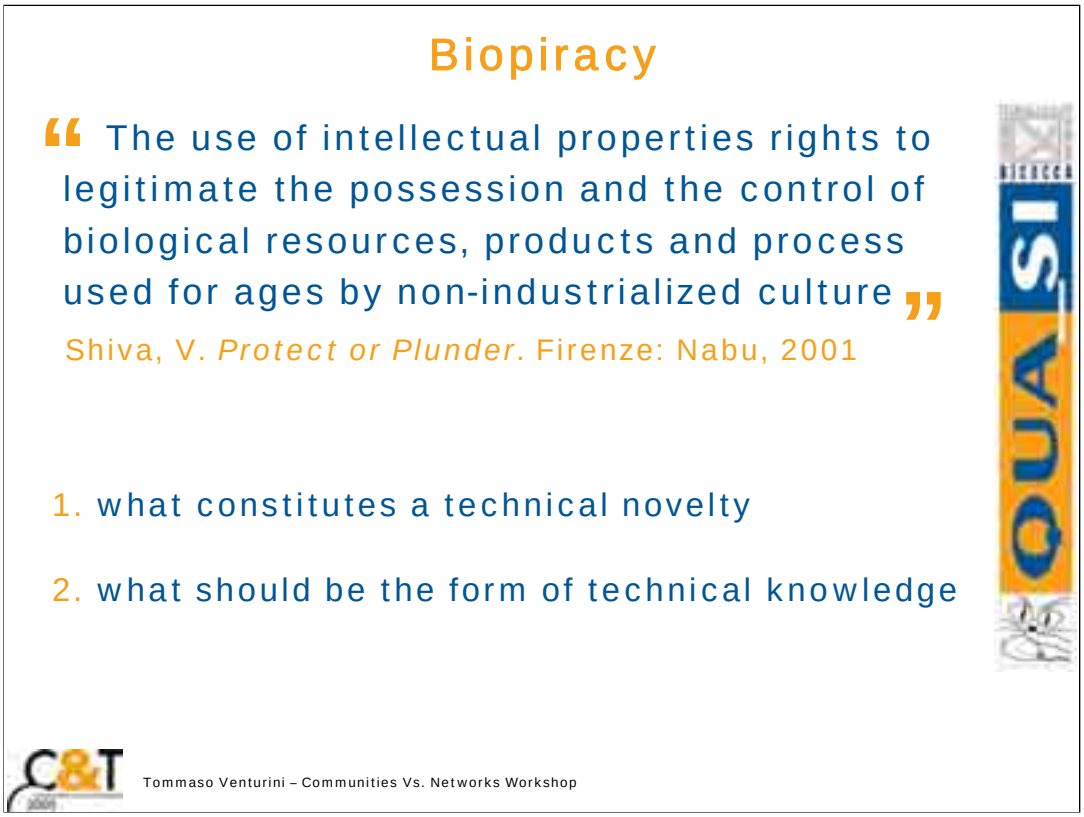


Let me use a **metaphor**.

As a free flowing river, communitarian technology draws its course through a continuous modification of the landscape.

Formal languages work as banks disciplining the stream of knowledge. Yet, the construction of artificial banks generates a consequential accumulation of dynamic energies. Cultural materials, which used to be scattered during natural inundation, begin to settle on the bottom, raising the bed of river.

Eventually, the inevitable flood of innovation produces a transformation of the landscape which is much more radical than the one produced by traditional development.

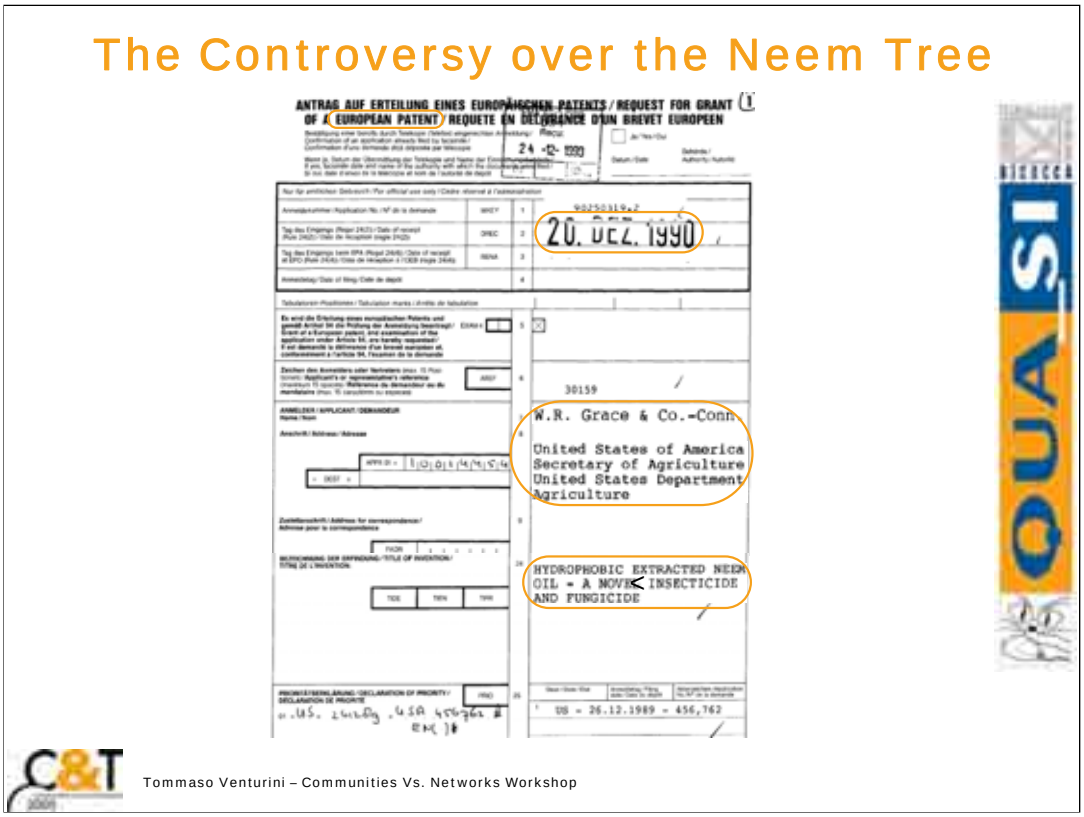


To conclude my speech I will give you a couple of **examples**. They are both taken from a very specific field: the issue of **biopiracy in agricultural technology**. As you probably know, biopiracy is a relatively new term which refers to…

Disputes over biopiracy concern a twofold problem – **first**, what constitutes a technical novelty and, **second**, what should be the form of technical knowledge.

The first part of the problem is usually raised by traditional communities. The disputed innovations, they argue, cannot be patented as they are nothing but translations into scientific terms of traditional elements cultivated and refined for centuries, though in an implicit form.

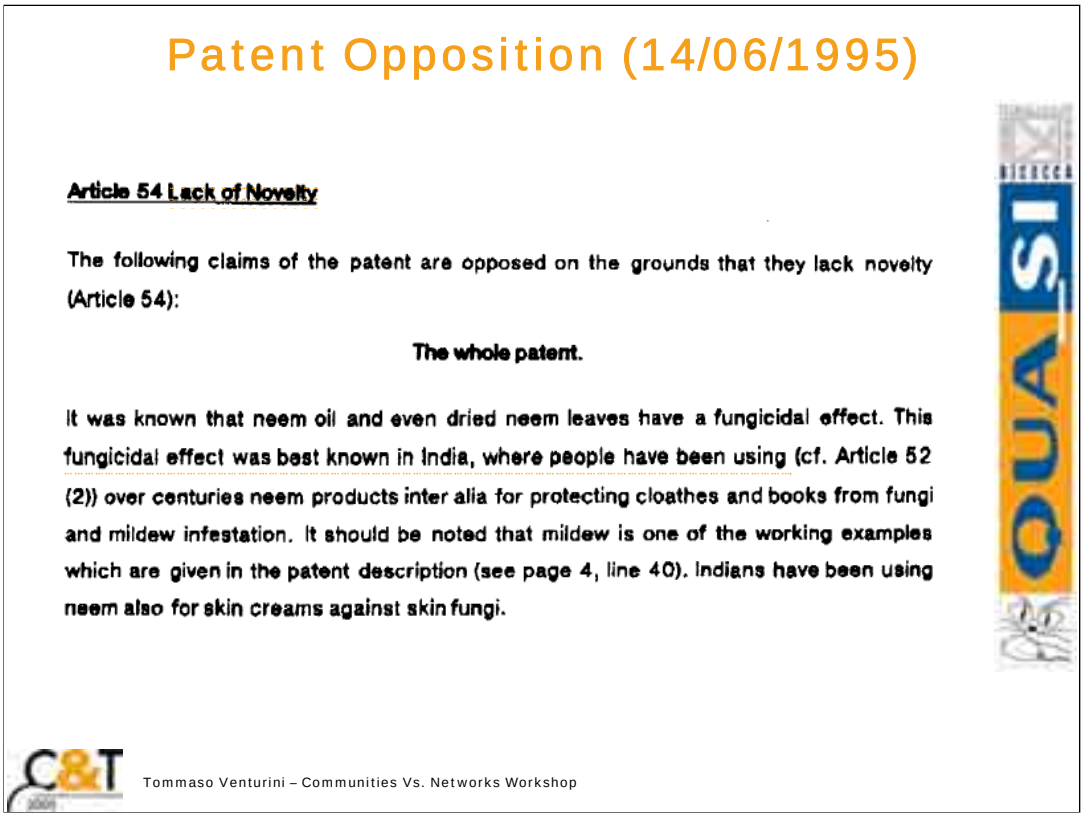
The second part of the problem is then introduced by patents' defenders who claim that formalization does constitute a substantial progress. As long as it remains implicit, they argue, knowledge will be confined within the limits of communitarian apprenticeship. Through formal codification, ideas are disembodied from their original setting and can be developed scientifically and industrially.



The first example concern a patent on a product derived from **Neem Tree**. The Neem is a tree which has been used for centuries in traditional indian agriculture and in ayurvedic medicine, because of its fungicidal properties.

On December 1990, the multinational corporation W.R. Grace and the Department of Agriculture of the United States applied to the European Patent Office for a patent covering a method for controlling fungi based on Neem oil.

At the same time, the American company started a very aggressive commercial policy, purchasing most of the Neem seeds collected in India, causing the price of Neem seed to skyrocket beyond the reach of the ordinary people.



This gave rise to a strong protest among Indian farmers which ended, in 1995, in a legal opposition against the patent.

The main claim of the opposition was that the technology patented by W.R. Grace lacked of novelty and inventive step, as it was directly derived from Indian common usage.

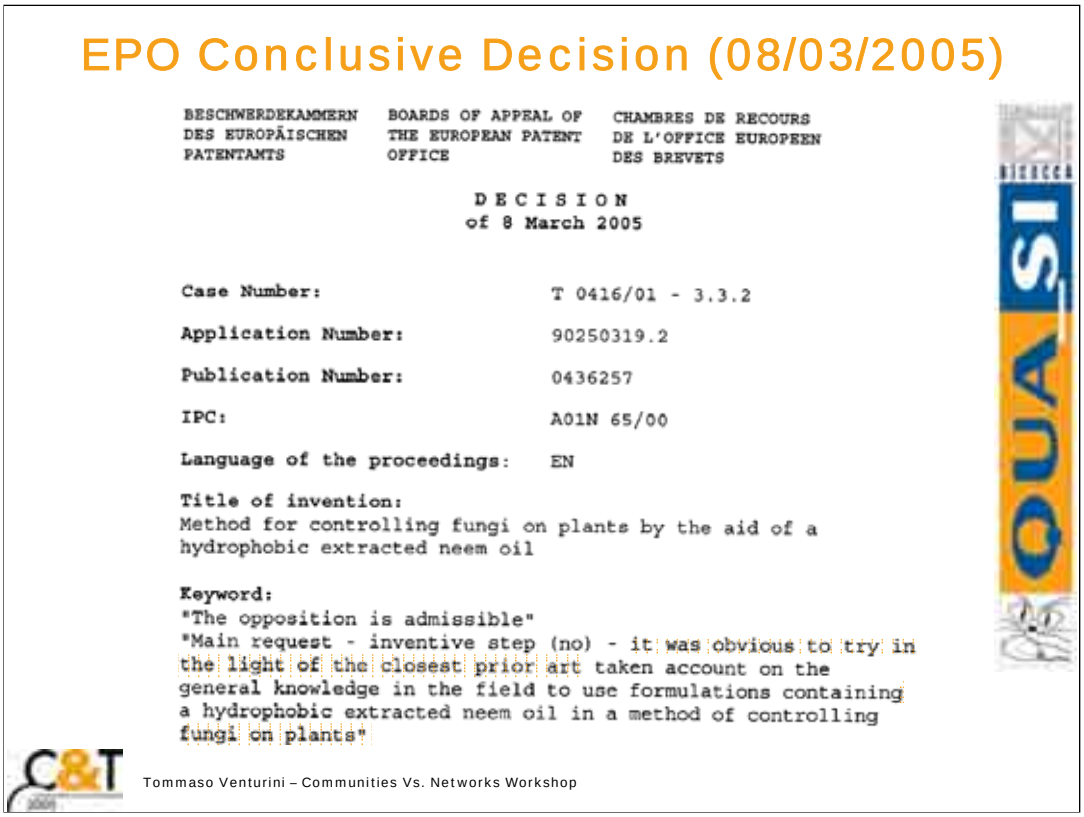
As we can read from the original opposition letter…

Owners Reply to Opposition (31/07/1998)

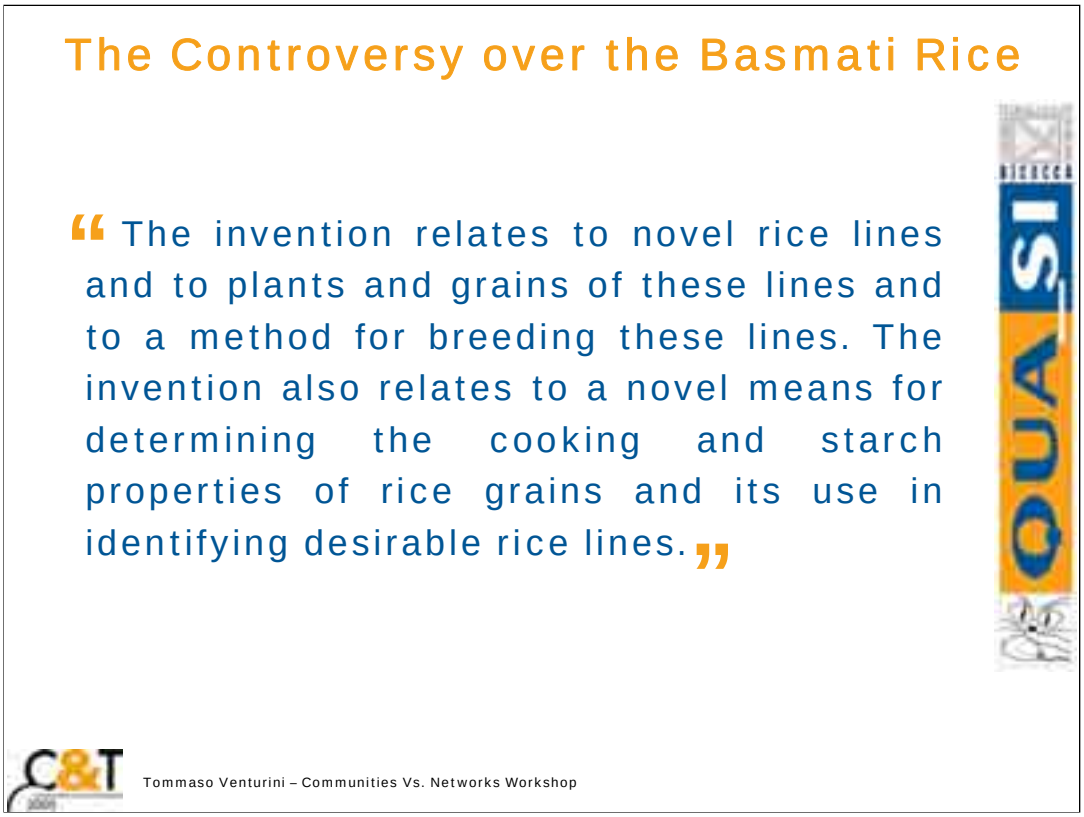
There is neither a specific mention of any farmer, any date of providing said material to said farmers, any detailed information about the kind of material provided with respect to its components or method of production, the date of obtaining the alleged results nor of the results reported. There is in addition no information about any publication of said obtained results.

However, Mr. Phadke only alleged in his additional affidavit that the extraction process and the plant treatment process for obtaining fungicidal effects had been demonstrated to an unlimited number of local farmers. But he did not provide any names of specific persons, dates, localizable specific areas or any other publication documents or record documents. Due to the lapsed time period of about 10 years the memory of Mr. Phadke without relying on written documentation might be somewhat uncertain as to specific processes and components used. A scientific or field tester must have some records for such experiments and tests which might give further information and prove the alleged events.

Very interestingly, the owners replied that the prior knowledge of Neem had **not** been **scientifically recorded**. The preceding fungicidal use, they claim, was indefinite and rough and therefore it did not count as a valid and demonstrable scientific precedent.



However, in two consecutive deliberations, the European Patent Office disagreed with the patent owners. After ten years of legal controversy, last march, the patent was eventually revoked because of lacking of novelty and inventive step.

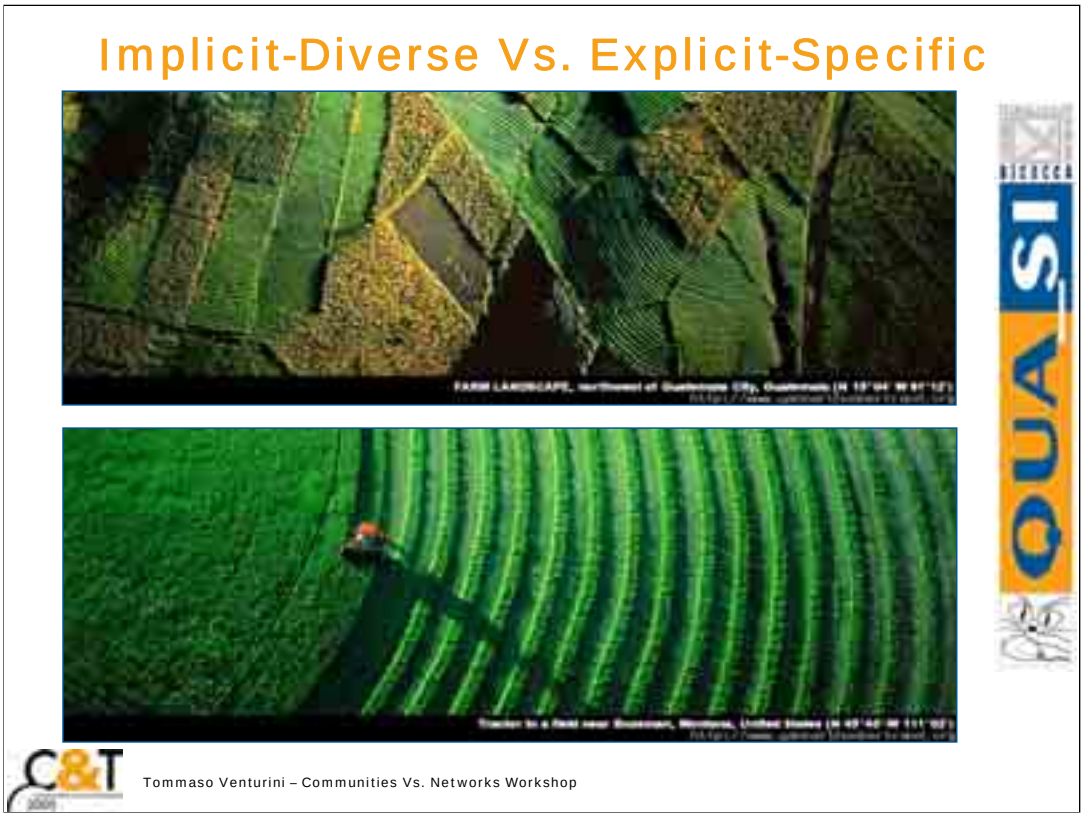


The last example concerns the dispute over the **Basmati Rice**. As you know, Basmati is a long-grained, aromatic rice traditionally grown in Punjab.

On September 1997, the United States Patent Office granted a patent on Basmati to RiceTec, a transnational company based in Texas. The original abstract of the patent reads…

This very broad patent gave the company several privileges on the use of the term “basmati” and on breeding basmati varieties.

Not surprisingly, this initiative provoked protests in India, forcing the Indian Government to oppose the patent. The official Indian challenge was limited to 3 claims of the patent. Knowing that these claims were clearly untenable, RiceTec withdrew them before the re-examination. Many Indian groups, however, were not satisfied with this partial withdrawal, which did not recognize the traditional Basmati breeder.



This controversy is more subtle that the previous. What is at stake in the Basmati dispute is not only the form of technical knowledge, but also its degree of **definition**.

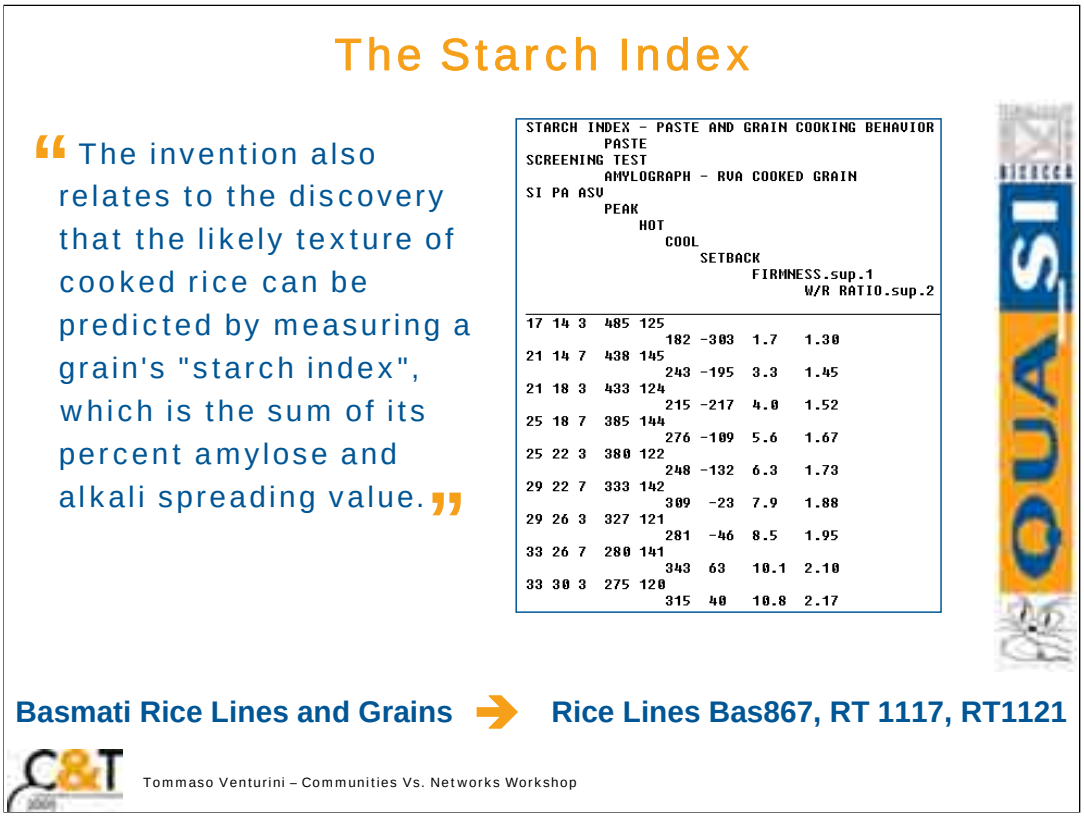
While explicit knowledge tend to be relatively more precise, as the process of codification require to define its objects, implicit knowledge is typically more vague and thereby more flexible and diverse.

This distinction is particularly evident in the field of agricultural techniques. It is something that can be appreciated in the **visual quality** of the landscape. For example, Looking at these fields it is easy to say which one derives from an implicit knowledge and which derives from an explicit agricultural technique.

The Biodiversity of Traditional Basmati

Tommaso Venturini – Communities Vs. Networks Workshop

In the case of the Basmati, the traditional Indian agriculture bred a cultivar which was in fact a mix of different varieties. This imprecision of the traditional cultivar is not due to a rudimentary technology, but it is functional to obtain crops that guarantee a minimum yield every years, under every possible set of climatic circumstances.



The RiceTec patent, on the contrary, was extremely precise, because it has a completely different goal. The RiceTec intention was to lay hands on the term “Basmati”. To do that, RiceTec had to persuade the Patent Office that the qualities of Basmati were not linked to the place of origin, but to chemical properties that can be obtained elsewhere too.

Therefore RiceTec invented the **Starch Index**, a sort of measurable indicator of the quality of the rice. As the original patent reads…

RiceTec then patented a very specific variety, but tried to use it to control the generic name Basmati. Eventually, though, the United States Patent Office decided to revoke 15 out of the original 20 claims and to change the title of the patent from… to…

Verba Volant, Scripta Manent

Communities Vs. Networks: from implicit to explicit technical knowledge

by Tommaso Venturini