



The Internet of Things,

ecology of barcodes, qr codes, rfid, active sensors, ipv6

logical extension of the computer to the environment, the environment as interface (ubicomputing, pervasive computing, Mark Weiser 1991)

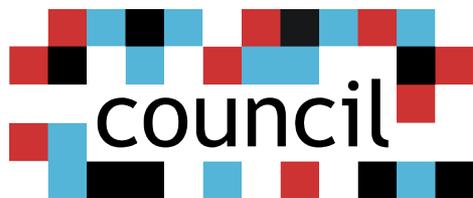
seamless flow between the

✧ BAN (body area network) : ambient hearing aides, t-shirts (ehealth)

✧ LAN (local area network) : smart meter, home interface (convenience services)

✧ WAN (wide area network) : the car (eCall)

✧ VWAN (very wide area network) : the 'smart' or 'wise' city (e-gov services)

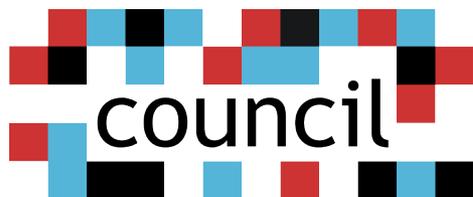


From: FInES Workshop @ Aalborg , Translating Knowledge into Growth: Views from ICT

'total' connectivity,

“Future businesses will operate in a universal business ecosystem in which ICT will become a context for business operation spanning the whole cycle of value from creation to consumption, encompassing both people and things, and seamlessly merging the physical world with the virtual world for the exchange of many different forms of information and the transaction of different types of value.”

“The marketplaces are likely to be radically different from those of today; the rules of engagement will be transformed to accommodate new business entities, relationships and networks; knowledge will almost certainly emerge as the premium asset and commanding currency.” (Workshop description document)



The Key Issue:

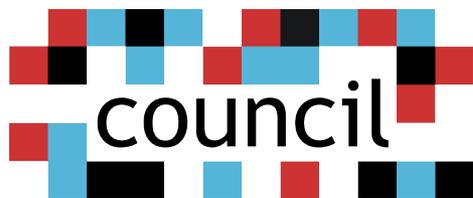
new entities as actors,

In the current framework we are used to dealing with three groups of actors:

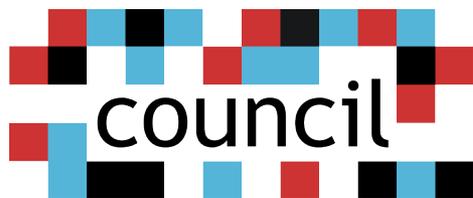
- o citizens/endusers
- o industry/sme
- o governance/legal

These all are characterized by certain qualities, 'a' for citizens, 'e' for industry, and 'o' for governance. In our current (Reference) Models and (Reference) Architectures we build from and with *these actors as entities* in mind. The data flow of IoT will engender *new entities* consisting of different qualities taken from the former three groups. There will thus be no more 'users' who need to secure 'privacy' as the concept of privacy has to be distributed over the qualities of the new actor. In this conceptual space we have build notions of privacy, security, assets, risks and threats....

Example: private grid operator



Gérald Santucci, European Commission IoT architect: “Some time in the relatively near future, the intelligence will be embedded in edge networks and devices rather than on the cloud(s). Therefore, information will no longer be confined in databases, monitor screens or smartphones of all kinds, it will reside in the objects themselves - buildings, cars, furniture, domestic appliances, clothes, bodies... Intelligence will be everywhere - around us (our environment), on us (our wearings), and in us (our body). Computers will be so small that they will become ubiquitous and invisible, thus heralding an era of "smart nano-things", and they will communicate with each other and automatically connect to a huge, complex network composed of millions of invisible networks. A new paradigm is slowly but surely emerging which will impose to revisit our concepts (e.g. from privacy to privacies, from human freedom to ethics in the knowledge sphere, from homogeneous information systems to heterogeneous mediators like (ro)bots, from data subject to the empowered citizen, etc. The pattern is on the side of decentralised, embedded, smart and connected machines/ objects.“

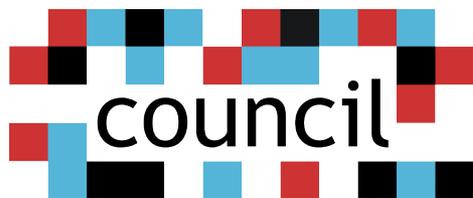


Historical background: Project Cybersyn, 1971-1973, Chile

“In this way we sought to endow the humblest Chilean enterprise with computer power - not to calculate its payroll or update its order books on which and similar trivialities most of the world’s computer power is frittered away - but to be a new lobe of the management’s own brain. We found that Cyberstride could track the course of the critical variables, and sound alarms about potential trends far more reliably than can the brain itself. There were many practical difficulties. The greatest was the need to tune Cyberstride so that it would not overreact. A special tuning programme had to be prepared for the purpose.

The conceptual framework we were using changed the way that both the government and industry looked at their problems. As the practice tools became available that enabled both to deal with the tasks of allocation and distribution, and to face up to emergencies by local shortages and even widespread strikes, the people found that the basic model made sense in active service. The process of innovation became a dynamic drive.

(CYBERNETICS OF NATIONAL DEVELOPMENT EVOLVED FROM WORK IN CHILE STAFFORD BEER
(The Zaheer Lecture, 5th December 1974)

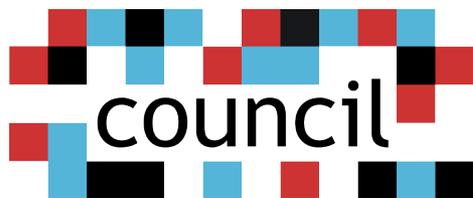


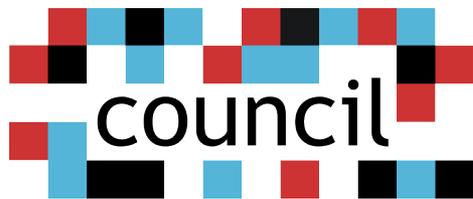
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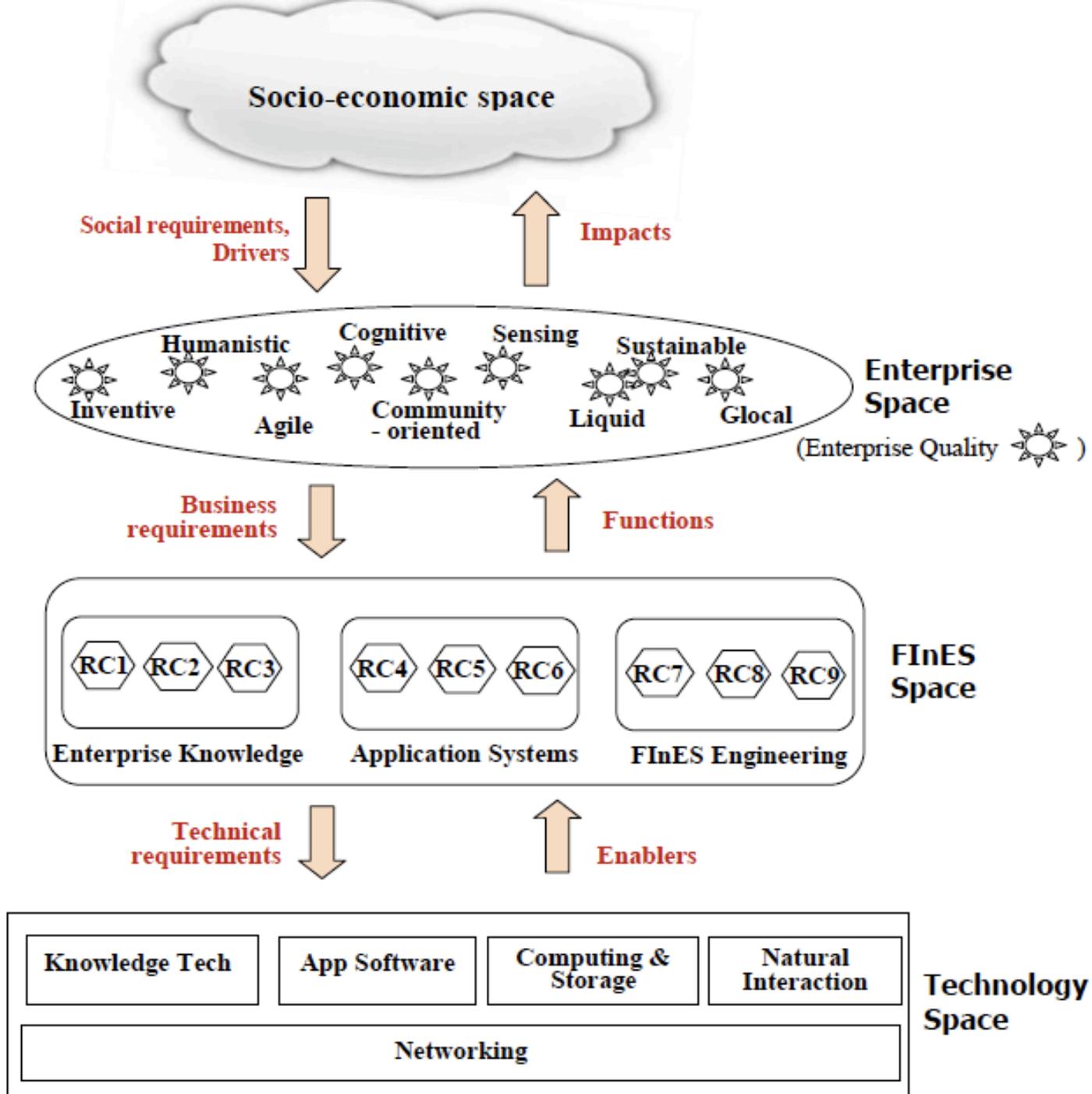
“If a system regulates itself by subtracting at all times as little horizontal variety as is necessary to maintain the cohesion of the total ‘system’ then the condition of autonomy prevails.

“Enterprises are horizontal components of an industry itself conceived as a vertical component. Now advance a level of recursion. Here there are industries- as horizontal components, and something called a branch of industry (such as ‘light’ or ‘heavy’) is the vertical component .Advance to the next level of recursion.The branches are now horizontal components, and the vertical component is total industry itself. Further level of recursion, industry joins agriculture, transportation, health, education, and so on, as a horizontal component of something called the economy).The conceptual modelling is not just fun and games. I mentioned earlier that I went to Chile armed with a basic model of organisation, based on neurocybernetics.”

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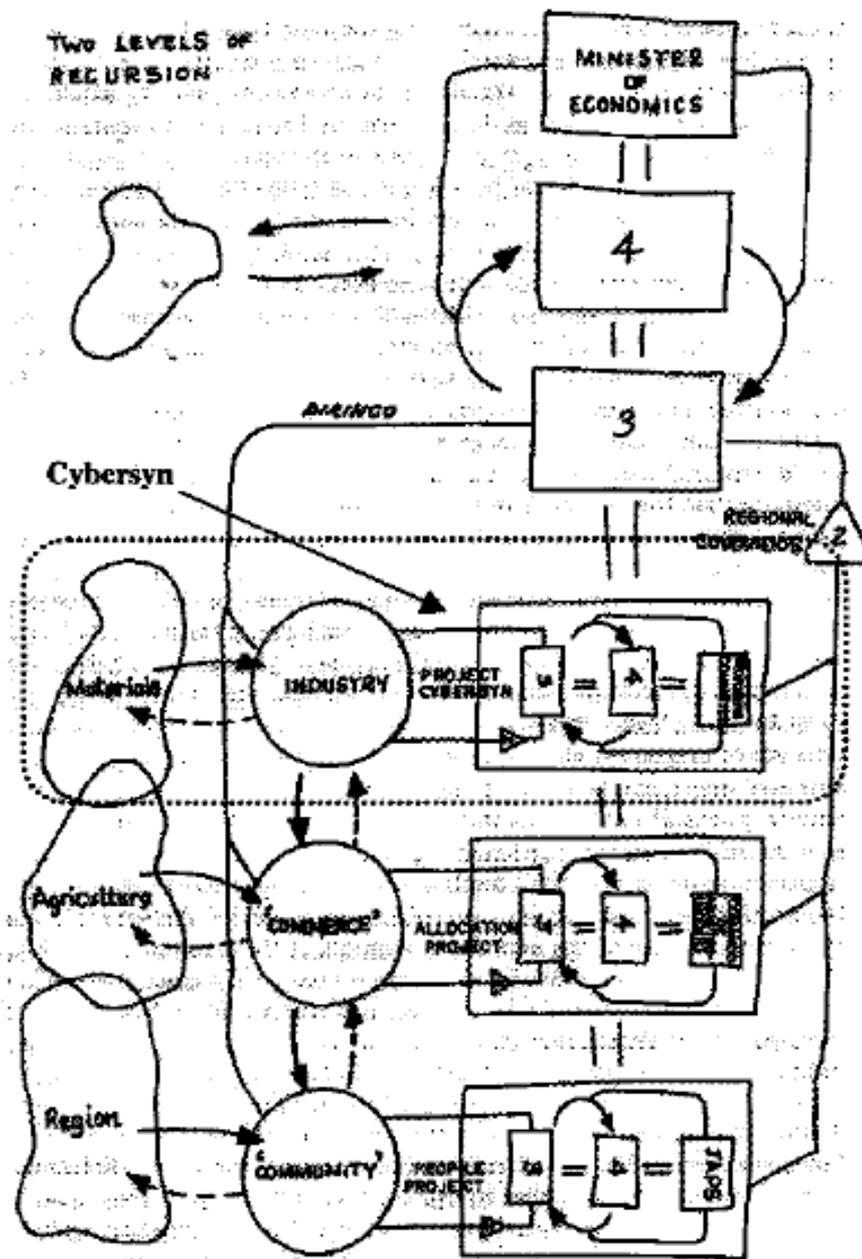


Figure 5: The new viable system drawn by Beer in December

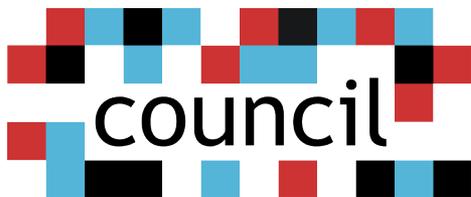
Business models

- ✓ Sharing: Zippcar/Buzzcar
- ✓ Innovation out of the boardroom: Quirky
- ✓ Air-egg community, bottom up
- ✓ Full traceability
- ✓ Leasing over ownership (electric car, battery is 40% of cost)
- ✓ Smart cities, gated communities is the logical next phase of capital



Ethics

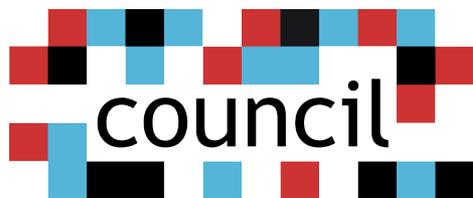
- Two outer ends: 500 military zones and Mad Max in between or an open generic hard and software backbone,
- Solidarity is the key
- Ethics as USP
- IoTi (www.iot-i.eu) deliverable : ethics label



urgency,

- Interdependencies in current system of stalling learning tools (1451 print, 1910s public libraries in Western Europe)
- Possibility of going fully parallel on mission critical services with IoT by groups of individuals evading taxes (subject of a brainstorm with Dutch Finance Ministry)
- Huge youth unemployment and lack of credibility of the elites

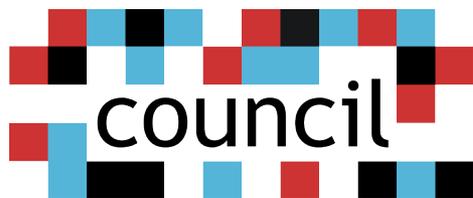
“All the above are taking shape against the backdrop of deep economic uncertainty and shrinking budgets universally, from which a new generation of leaner, agile and adaptive businesses should eventually emerge.” (FINES)



decision making systems, experts and their new role,

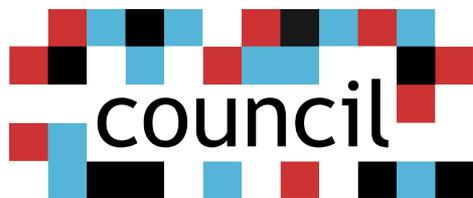
Experts have to become more 'political', and 'take over'.

Stafford Beer: "When the professional institutions of Chile finally became aware of project Cybersyn, they asked me to address them. I was open with my attitudes to them, as I am with you today. They were deeply shocked. They called me a partisan. Of course I am a partisan, because I am a human being, and to be a scientist is less than a castration. Perhaps this shocks you too. But if so, that is an intrinsic part of my message that you may accept or reject with all the rest. The time has passed when professionals can possibly disown the consequences of their work."



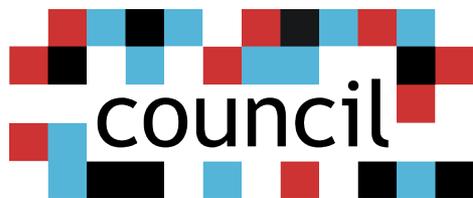
Understanding the nature of social relations show how difficult it is to script moments of fundamental change, as hierarchical systems by the very fact that they are top down can concentrate on managing systematic forces relatively effortlessly. That which they can not predict or control remain lone dissident, strange or abnormal voices, or 'sudden events'.

With the internet these idiosyncrasies have been able to organize and raise their weight in the ratio, and the internet of things will allow these even further, bringing the sensor network data sets individuals can handle to them on their devices. This acceleration of weak signals into clusters, organized networks and flukes can not be managed anymore by formats that are informed by and that inform systematic forces as the nature of these forces has changed.



No system build on isolating data and relatively closed decision making processes can withstand a combined operations of the sharing and collaborating potential of the internet and the internet of things. I hope to show that this should not be seen as an 'attack' on this system, but as the hyper realization of certain elements of cooperative behavior without which the current democratic welfare state could not have been conceived in the first place.

If we work together we can keep the infrastructure intact (would it not be nice to not smash the bakeries and demand bread in the morning?) and use that as an open soft- and hardware backbone for applications and services, thus matching the best of the old democratic traditions with the new forms of crowd sourcing, funding and building.



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www.theinternetofthing.eu

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in IoT-I www.iot-i.eu on ethics

In IoT-A www.iot-a.eu as stakeholder coordinator

