Janie Chroust, 2010

International Federation For Systems Research

"Systems and Science at Crossroads"

Supplement to the Proceedings of the Sixteenth IFSR Conversation

G. Chroust, G. Metcalf (eds.)

April 14 - April 19, 2012
St. Magdalena / Linz (Austria)

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Foreword: Supplementary Material

Gary Metcalf , Gerhard Chroust

IFSR Conversations have more than 20 years of tradition and over the time have evolved a rather standardized form: The Conversation lasts for 5 days (in the last years from Saturday to Thursday) and comprises 4 or 5 teams totaling approximately 30 participants. In the last two conversations a few outsiders had been included via electronic conferencing.

The 5-days intensive work in each team produce a considerable amount of tentative and final outcome, which was published in several ways:

- A small set of results was published in the IFSR Newsletter, printed in early fall of the same year and sent as hardcopy to IFSR members and VIPs of the IFSR and published on IFSR's homepage (Chroust, 2012a).
- A more elaborate, refined report per team is published in the Proceedings of the IFSR Conference (with an ISBN-number) in late fall of the year (Chroust & Metcalf, 2012b). The proceedings also contains individual papers supportive – or even sometimes contradictive - to the team report. Hardcopy of the proceedings are sent – on request – to all participants of the IFSR Conversation and are also available o IFSR's homepage.
- Additional material resulting from the Conversation which was too voluminous and/or too specialized to go into the proceedings (e.g. a day by day log of activities, intermediate hand drawn charts) was collected as a special supplement volume (Chroust & Metcalf, 2012c) also carrying a ISBN-number. It is usually not very instructive for outsiders and probably only useful in conjunction with the proceedings.

References:

Chroust, G. (ed.) (2012a) IFSR Newsletter, vol. 29 (2012), no. 1, IFSR - International Federation for Systems Research, Linz, and [http://www.ifsr.org/newsletters].

Chroust, G. , and Metcalf, G. (eds.) (2102b) Systems and Science at Crossroads - Sixteenth IFSR Conversation, Inst. f. Systems Engineering and Automation, Johannes Kepler University Linz, Austria, SEA-SR-32, Sept. 2012 and [http://ifsr.ocg.at/world/files/$12m$Magdalena-2012-proc.pdf].

Chroust, G. , and Metcalf, G. (eds.) (2102c) Systems and Science at Crossroads - Sixteenth IFSR Conversation - Supplement Inst. f. Systems Engineering and Automation, Johannes Kepler University Linz, Austria, SEA-SR-32, Nov.2012 and [http://ifsr.ocg.at/world/files/$12n$Magdalena-2012-supp.pdf].

Team 3:

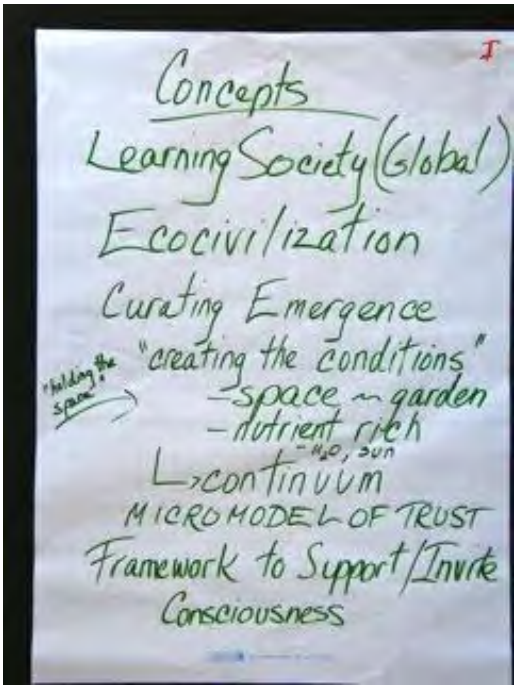
Curating the Conditions for a Thrivable Planet:

Systemic Leverage Points for Emerging a Global Eco-Civilization

Supplementary Material

Ockie Bosch - Australia
Nam Nguyen - Australia and Vietnam
Violeta Bulc - Slovenia
Mary Edson - USA
Jennifer Wilby - UK
Stefan Blachfellner - Austria
Alexander Laszlo - USA
George Pór (virtually) - UK

Day 1: Recap of initial generative discussion from the evening before:

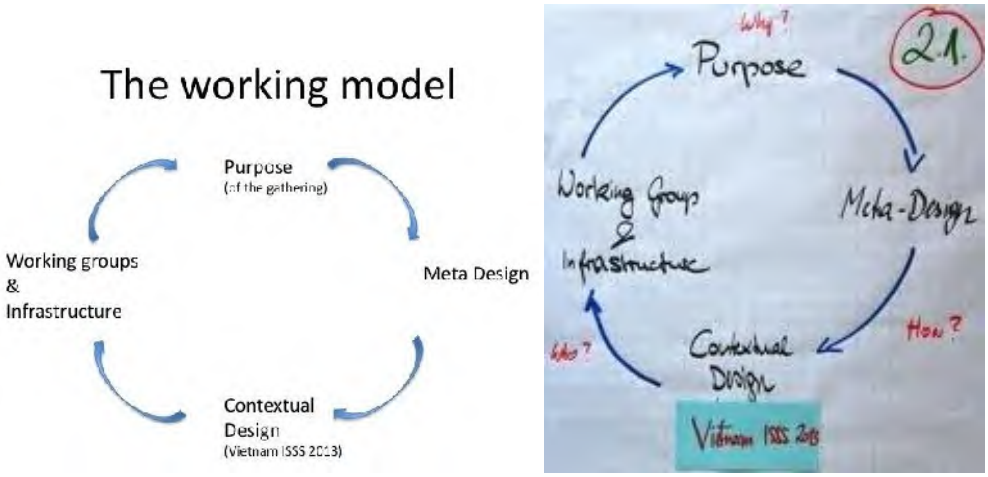


Stefan: objectives –

- ⊙ to prepare the platform for ISSS Vietnam
- ⊙ to design the prototype of gatherings like this one

We also decided on the main thematic orientation which was along the lines of coming up with *systemic leverage points for curating the emergence of a global learning society for a new eco-civilization.*
We also agreed that we *must* come away from this process with a clear commitment to collaborative action.

Stefan then presented a basic meta-model for structuring/guiding our work during this Linz Conversation event.



George: what do we mean by "curating emergence"?

Jennifer: for me it refers to how the curator (of a museum, typically) shepherds the exhibition.

Alex&er: it's like a gardening metaphor where the gardener has to step away from the plot in order not to continually cast a shadow on them. The important focus is on making sure there is a nutrient rich soil, not on trying to make a specific out crop come about.

Stefan: two things we have to do –

1. one involves a degree of planning, as Ockie points out.
2. even though the participants have the capacity to create their own space, there needs to be occasional 'micro-management' to help structure the process.

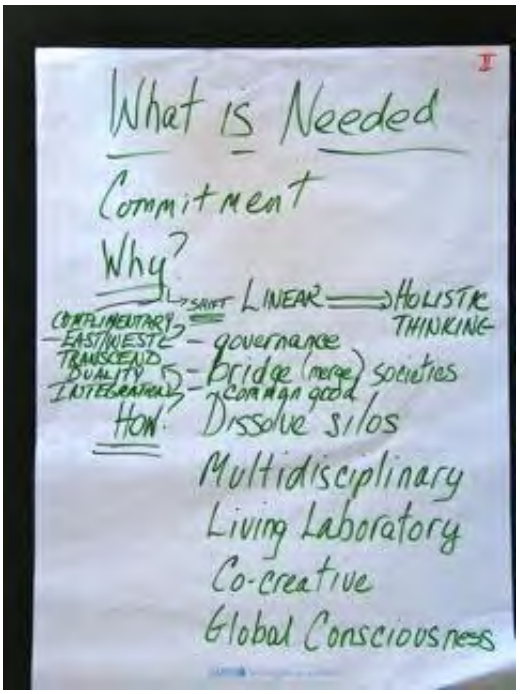
Violeta: let's look at the purpose of what a system is dedicated to. If you want to raise the consciousness of the group, you have to hold the space. If you want to test the validity of your views, you have to go more into micro-management. We need to do both.

Alex&er: we definitely have to be normative – we ought to be trying to create the 'fuzzy guiding principles' that provide a framework/structure within which people can contribute their gifts to an emergent (but directional) process. (The directionality relates to the issue of emerging a global learning society for a new eco-civilization.)

George: Please see my "chaordic dialogue" blog http://blogofcollectiveintelligence.com/2009/04/16/chaordic_dialogue_practice/. I think it can be relevant at some point, during the days to come.

Ockie: We could share our experiences that already provide some tools for us to draw upon in this work.

Alex&er: perhaps we could start by clarifying the 'why' of what we are doing.



Ockie: my why relates to the fact that we are working on systems design for complexity management. We know we cannot solve the problems in a meeting. so we create living laboratories where people learn simply systems tools to help them change their mindset from linear to more holistic thinking. To change from linear thinking to holistic thinking is an extremely hard thing to do. The way in which society is currently operating makes it extremely difficult to actually achieve such a mindset change. That is why we need to start with the young as a major leverage point to achieve this goal. There is evidence that we *can* actually change society through the type of work we are doing.

Violeta: co-creation is definitely a main aspect of this work – of the *why*. Another is to prevent wars – I'm from the Balkans and this is a living reality. We also could look to ways of bridging civilizations, to bring cross-civilization wisdom. We need to find ways of honestly engaging in societal change that addresses the common good of the broader society.

Nam: there are complementary ways of learning about what is in the greatest interest of the common future of humanity.

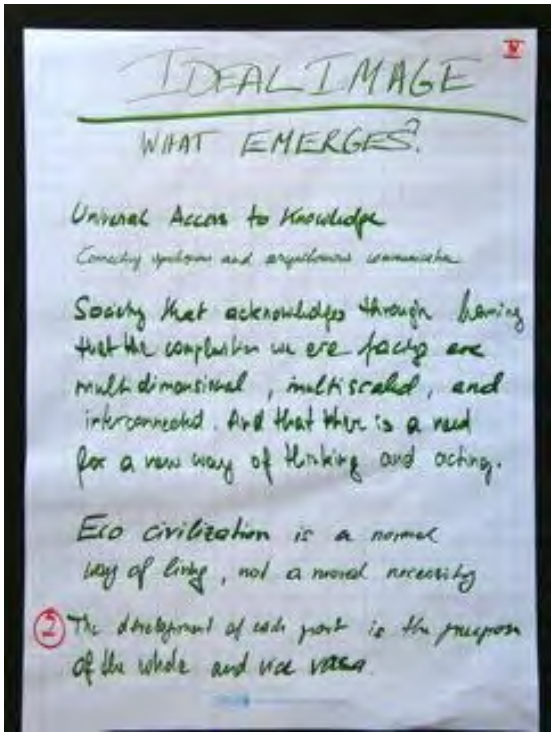
George: If one of the conditions for Designing Learning Systems for Global Sustainability is creating a Global Knowledge Pool, then wouldn't it be useful for modeling it in a very small scale by prototyping a pool of this group's relevant knowledge?

Jennifer: we have to get beyond the dichotomy of 'holistic' or 'systemic' thinking ***versus*** reductionistic or analytical thinking. It's all a continuum and we need to see how to move along this continuum in healthy ways, not to try vainly to reconcile the perceived "two" since they really are not at odds.

Stefan: I'm not so comfortable thinking about 'the society I dream of' since I believe it really must be emergent and I cannot project my dreams upon it.

George: I like very much your earlier emphasizing the normative dimension... OST and World cafe are just sooo Green, but the can also be used in an evolutionary context... I am sensitive to the fact that we are at the very beginning of a process of generating a system that is a very complex system. The initial conditions are very sensitive and critical. A specific aspect of these conditions relates to how we are creating our own pool of relevant knowledge. We need to pay attention to what is needed – what can we do so that we have access to and can rely on each other's knowledge to deal with the

challenge of important pieces of contribution from different people being overlooked because we are so focused on a sequential conversation. It would be good if we had a way of capturing and being able to respond to these contribution.



Violeta: my dream is that we have universal access to knowledge and that we have no property concerns relating to knowledge. It is a real imperialistic constraint that we don't have free access to each others knowledge.

Ockie: it's a great dream, and I share it. But such a view is, for example, completely against the current normative behavior of an entire society such as China.

George: I believe that a key to moving from a community of learners to a community that learns is finding a system and a process for connecting and synergizing two modes of human communication: the real time and they asynchronous modes. Violeta talked about sharing the relevant pieces of what we write – that's an example of asynchronous communication. It would help create a shared pool of this group's relevant knowledge.

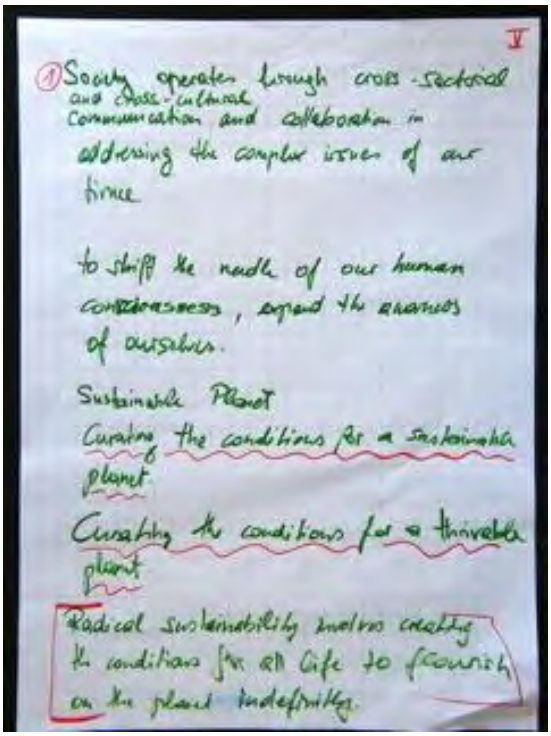
Alex&er: I will gather the notes (from Violeta, too), and send them to George. He will abstract them and get them into an emergent record of what we're coming up with for the beginning of each day of our meetings.

Ockie: I see that we are seeking to move toward **a society that acknowledges through learning that the complexities we are facing in the world are multi-dimensional, multi-scaled, and interconnected and that there is therefore a need for a new way of**

thinking and acting in dealing with issues of governance at all levels of human interaction.

=== break ===

Ockie (again): we are looking to move toward a **society operates through cross-sectoral and cross-cultural communication and collaboration in addressing the complex issues of our time.** That is the dream that I have.



Stefan: I teach 'supply chain management' and there is this quote they use: if we want to deal with complexity, we need to reduce it. That always strikes me as problematic (he used another word). What puzzles me is that many people agree with this statement, and what's more, act in this way.

Jennifer: where you require more than one scalar level to describe something, then you have complexity.

Alex&er: we can think of evolutionary process as a tendency toward greater *structural complexity* and *organizational simplicity* , more efficient modes of operation, and greater dynamic harmony.

George: suggestion for a "future society" proposal that is simple in its expression and has tremendous amount of complexity absorbed by it: a society, where the full

development of each part is the purpose of the whole, and vice versa. the expression should be so that ordinary people, not only systems scientists can understand it.
I would like to understand what the group is to whom we are addressing our proposal – is it the IFSR or the ISSS or the whole of society or future generations? If this is a proposal for **a future society, then it should be about a society where the full development of the whole supports the full development of all of its members**. The governance and production of such a society does absorb a tremendous amount of complexity. Really complexity and simplicity are not in conflict.

Violeta: we must address the issue of the management of fear. People are afraid are lacking the ability of systemic thinking.

Ockie: let's address this very important topic when we get to a consideration of the drivers for the process.

Stefan: in today's world, we still address these topics of societal chance from a moral perspective. Nobody wants to hear such messages. If we show people how they gain value for themselves as well as for their systemic environment, they can see that there is real value creation. Then you don't have to talk about morality any more. This is what I call the normal living of an eco-civilization. You don't have to imply any other values to it, because it is already there.

Ockie: in our own work, we avoid talking about things that are 'economically sustainable' for example. Economics is a part of sustainability. It is the interaction between environment, politics, society, etc which makes a practice sustainable. My question is why we call it 'eco-civilization' which gives it an environmental flavor. I would call it 'sustainable' which leaves it much stronger.

Stefan: eco-system encompasses the whole. Sustainability tends to be a component of human interest within the ecosystem. Those in favor of sustainability tend to sustain the current paradigm of interaction. What I find attractive of the concept of thrivability is that it brings out the idea of how life creates the conditions for life.

Alex&er: for any system to safeguard its evolutionary viability, it must focus on its embedding system.

George: What is the embedding system of the mind space, from which we operate in meetings like this?

- if we want to be part of the narrative, it could be useful to take a systemic look at these narratives articulated by Duane Elgin: Here are four of more than a dozen 'stories of great transition' that illuminate a promising future (for more, see: www.GreatTransitionStories.org). These narratives are of universal concern, simple and relatively easy to understand, emotionally powerful, and able to call

forth our higher potentials; and all involve a time of profound initiation and deep transformation:

1. Humanity is Growing Up: Over tens of thousands of years, the human species has been learning and maturing. We have moved from our childhood as awakening hunter-gatherers to our late adolescence as a species on the edge of a planetary civilization. We are now moving collectively through a rite of passage, toward our early adulthood as a human community.

2. A Global Brain is Awakening: An unprecedented revolution in global communications is underway, integrating powerful technologies ranging from wireless networks to Internet connections, cell-phones, televisions, and much more. Combined, these technologies are rapidly wiring the global brain and supporting the awakening of collective consciousness from a local to a global scale.

3. Humanity is on a Heroic Journey: The Hero's Journey has three, major stages: separation, initiation, and return. Over the past 45,000 years or so, the human community has moved from a long stage of separation from nature and one another, and we are now moving into a time of initiation, from which may come the insight to begin our journey of return to living in harmony with Earth, one another, and the living universe.

4. Choosing Conscious Evolution: Consciousness is the knowing faculty. Our capacity for reflective or witnessing consciousness – to know that we know – enables us to take greater responsibility for our actions and their consequences. Unprecedented global crises are pressuring human consciousness to develop further, and we are poised to awaken to a collective knowing that we can choose consciously to evolve our capacities for living in harmony with the rest of life.

⊙ This is a rare moment in human history when we are beginning to develop, for the very first time, the "story of, by, and for all of us." There may be no more important task for humanity than to cultivate narratives in our collective imagination that can serve as beacons for guiding us into a promising future.

the quote above is from http://www.integralrevolution.com/integral-activism-in-the-social-commons

John Ehrenfeld: Sustainability is the possibility that humans and other life will flourish on Earth forever. Reducing unsustainability, although critical, will not create sustainability.

Michael Ben-Eli: Sustainability pertains to a balanced interaction between a population and the carrying capacity of an environment such that the population develops to express its full potential without adversely and irreversibly affecting the carrying

capacity of the environment upon which it depends. (Sustainability: The Five Core Principles A New Framework, 2004, 2006)

Alex&er:

> **Systemic sustainability**: a process of development (individual, corporate, or societal) can be said to be socially and ecologically sustainable if it involves an adaptive strategy that ensures the evolutionary maintenance of an increasingly robust and supportive environment.
> **Sustainability management** is the creative and responsible stewardship of resources — human, natural, and financial — to generate stakeholder value while contributing to the well-being of current and future generations of all beings.

Emergent focus:
Systemic leverage points for curating the emergence of a thrivable planet

Alternative words to "curate"

- mid-wife
- work together toward
- facilitate
- captain
- steward
- shepherd
- advocate
- mentor
- catalyze
- assist
- foster
- nurture
- nourish
- enhance
- evolve
- develop
- design
- incite
- co-creating
- enhancing
- cultivate

=== lunch ===

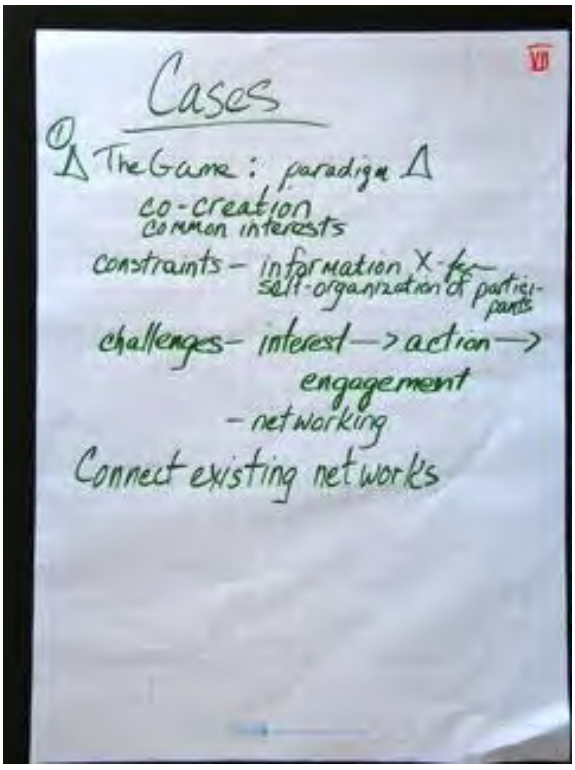
Nam: what about *working together toward a thrivable planet…*

Ockie: or *co-creating a thrivable planet…*

Jennifer: that becomes too homo-centric again.

Violeta: let's just return to the issue of *curating the conditions for a thrivable planet*

Alex&er: I would like to see the notion of *emergence* not lost from this expression, and I also think that, at least for the ISSS, we need to make some reference to working with *the systemic leverage points.* Additionally, the notion of a 'thrivable planet' is powerful, but the challenge for humanity is to design …. what? a planet? the biosphere? a civilization?



Stefan: The idea of the Change The Game initiative revolves around the fact that it is primarily an inter-personal network. It seeks to bring together the people who are the leaders in paradigm change around innovation, ethics and leadership. The goal is to have people engage in ways that multiply the resources available to them. It is focused on a process of self-organization around common interests.

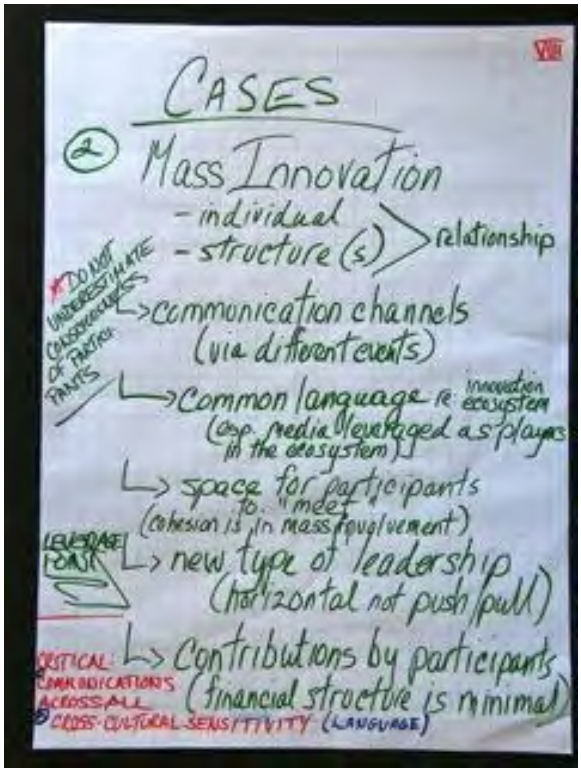
Violeta: it's about creating platforms (space) for people with common interests to interact with each other. (e.g., CTG)

Stefan: so CTG could offer the cross-connection of existing communities in networks that relate to the challenge of curating the conditions for a thrivable planet.

George: it is interesting for me to be a part of at least half a dozen networks of conversations about creating a better world. What difference would it make for us to consider this as something that is happening through us, not as something we are trying to make happen. The metaphor is more about looking for the common elements of an emerging process through listening for them rather than trying to create them.

Violeta: rather than putting networks together, the objective of INCo and CTG, for example, is to make sure that the transparency of ideas and information is transparent and fluid. Information is traveling through seamlessly, ideas flow - not creating structures but facilitating processes. Each individual is a node...

Alex&er: it is not about creating structures or meta-structures (such as networks of networks), but more about making sure that there are coherent flows and processes that empower and enable the people in the associated networks.



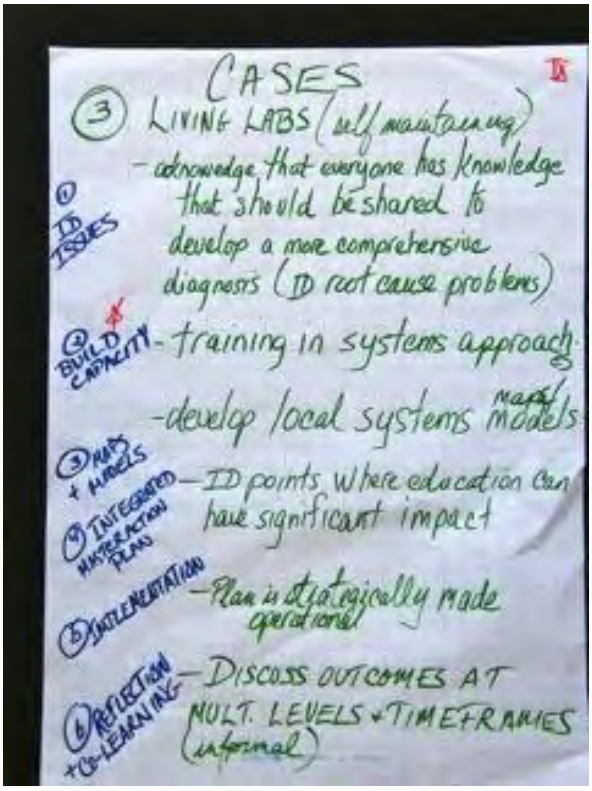
Violeta: InCo relates to the issues of the relationship between individuals and structures. It began in 2006 and has to do with promoting mass innovation as a driver for society. The importance of communication is key. The participation of an innovation ecosystem revolved around communication. Of course, first we had to come up with a common language. The media can be a very strong player in creating any kind of ecosystem. We

learned that we need a new type of leadership. Top down and up front leadership created completely top-down ecosystems. We cultivated the emergence of leadership from with by having individuals being just very active nodes, not pushing or pulling anyone anywhere. There was no real financial depended in this process – it was all volunteer based. We were able to do a lot without any money involved. We also learned not to underestimate the level of consciousness of those who joined these events. We created for the corporate environment a horizontal infrastructure to support mass innovation. It works for any organization. We also started the case of innovative local communities. We worked on training all the participants in a local community areas toward a cooperative arrangement within and across local sectors. It was important that all the participants had a common experience and common language to help emerge common projects. The cohesion through activating the base of the pyramid creates the platform for innovative thinkers and doers to really get things going.
http://www.incomovement.eu/

Violeta: my offer is to confirm the need for creating a space with a strong communication layer that allows all the information to move fluidly throughout the system. Meetings, sessions, conferences, media, etc. Also, the powerful focus on finding financial resources and training people. In addition, there is the focus on bringing them together in networks for common projects. We also are clear on the importance of being culturally sensitive in our projects.

Ockie: presentation on the Living Laboratory for Managing Complex Issues. [see resource document he provided] the idea of using UNESCO's biosphere projects as the basis for the type of learning laboratory design of GLL.

Ockie: we offer a methodology for creating informal learning spaces or platforms. We can also offer formal education in the form of undergraduate and postgraduate courses. We can also offer networks which other networks and individuals can tap into. We also offer a mechanism for creating effective future systems thinking/acting leaders through the Eco-Policy Game, which is part of the Eco-Policy Aid project.



Alex&er: The GBU offer emerges from the following strengths:

1. it offers a platform for engaging a broad cross-section of humanity that both has and does not have access to opportunities for higher education in a learning process that provides both their local and global conditions.
2. it provides an educational frame that goes from broad historical and evolutionary perspectives that celebrate the grand narrative that brought forth life and the universe as we know it to critically assessing the unsustainability of contemporary civilizational dynamics to empowering students to create new realities and to live into them.
3. It has an R&D branch that provides relevant learning content and processes for emerging a thrivable planet
4. it produces a huge pool of students who are in search of systemic sustainability projects in which to engage.
5. it offers a rich and extensive network of content developers and luminaries – both as a resource that it already has, and as a request for contributions.

<u>Day 2:</u>

Stefan proposed a generic title and specific sup-title combination:

Curating the Conditions for a Thrivable Planet:

Systemic Leverage Points for Emerging a Global Eco-Civilization

Violeta: we can think of the title as pertaining to the meta-design objective and the sub-title pertaining to the specific project of ISSS 2013. There will be other inputs (project, and learning spaces) that can be integrated in service of the title, and they would have other sub-title descriptions.

Ockie: we have these different initiatives and we may find spaces to combine them through specific events. The ISSS could provide some opportunities for synergies like this. We can go through our list of what we do and we could find the areas of potential synergy and address the barriers to them.

Alex&er: we can think about this opportunity as a very pragmatic one. And we really have to see how we can "walk our talk" in the design of what we are bringing forth.

Stefan: it is important to recognize that there are two silos of the Tribes that Violeta talked about. There are the people working on ISSS2103 in Vietnam and those working on it from abroad (such as those of us here, now). We also can identify the "systems practitioners" and the "systems scientists" as other key audiences to attract. If we now concentrate our conversation on the design of ways to bridge the various initiatives we already have, we need to focus on how we can provide a platform that can network these initiatives *with* the ISSS.

Nam: we should not forget that ISSS2012 in San Jose should be leveraged as a platform for ISSS2013 in Viet Nam.

Alex&er: Please consider the Evolutionary Development SIG (ED SIG) as at the complete disposal of this group for our work. In San Jose, the ED SIG will be co-chaired by me (Alexander) and Judith Rosen, but the only pre-determined aspect of our focus is that we have agreed to include a post-conceptual and arts sensitive component to the activities of the SIG this year.

Jennifer: we need to keep in mind that there are *formal* stakeholders whom we need to address in whatever design we come up with for the ISSS. We have a legal obligation to

the members of the ISSS, and we also must address the interests of the sponsoring partners in Viet Nam, and finally, we have to keep in mind the formally associated organizations with whom we are working already (INCOSI, ASC, etc.).

Violeta: There is no systems approach to addressing the need for facilitating the boundary interactions of various organizations and networks. We have a great opportunity here!

=== break ===

George presented his notes and synthesis from yesterday. His document is in our shared DropBox folder called “Linz Teamaterial”

Stefan: We ought to be considering a richly expanded array of stakeholders for ISSS2013 that would invite a broad cross section of society. Whatever platform we design should be with a mind to the working groups and infrastructure for the meta-design model that will continue well beyond ISSS2013.

Ockie: There will be the opportunity to invite people and organizations so that they an see all the good we are doing toward creating the conditions for a thrivable planet, and that we cannot do this without funding. Official things like AusAid, USAid, GTZ in Germany, etc. And then there are also famous people like Brad Pitt, Bill Gates, etc.

Alex&er: And we have to constantly check to see that we are respecting the systemic operational parameters of the ISSS in terms of its mission, vision and values. So long as those are not broadened to the extent that the ISSS becomes a be-all catch-all for anything and everything.

Violeta: if we can address systems thinking and innovation culture through a real connection with the youth of the world, really emphasizing the future challenge component of the work.

Ockie: Presentation on the origins of the GLL —

In 2009, when the Global Living Labs (originally called the Global Learning Labs) were local and individual initiatives, there were projects in Cat Ba (Viet Nam), China, Cambodia. There were also alliance based projects in New Zealand and other place.

UNESCO came up with the idea of using these projects as platforms for learning how to manage these areas sustainably. We started with Cat Ba and used the process I presented yesterday (see DrobBox files).

Then we thought we should have a *Global* Learning Laboratory that links lots of the biospheres that are managed sustainably, and that we should like them in a way that allows us all to learn with and from each other.

These places are *living* laboratories. They are not conservation areas (by and large), and people live there and there are businesses there, etc.

If we have this Global *Living* Laboratory Network, the biospheres and living labs and other such initiatives will come together once a year to share – through their own cultural, political lenses – to explore and share how they can learn from each other and experiment with different ways of managing these areas.

We realized that we need to involve more than just the people who are involved in these formal and informal biosphere reserves. People need new roads, they need a waste treatment plant, they have hotels and tourists and they need to deal with the environmental (and other) costs of dealing with them.

So we thought to invite funding agencies such as AUSAID, USAID, GTZ, Denmark, Netherlands, and the consuls of countries that have money who are interested in funding such systemic sustainability.

We are not interested in treating the symptoms. **We are interested in working with the people, finding the systemic interventions (not the 'management strategies') to achieve the goal of systemic sustainability.** We move away from quick fixes and we educate the potential funders that we are looking for systemic intervention points that are not for quick fixes.

UNESCO has promised to fund some of the potential participant funders to come to the conference and learn about the GLL Net.

We thought that what we ought to do is have our annual meetings in a different biospheric reserve each year. And then came the idea of also having an alternate reflection meeting every now and then in combination with the ISSS. We would like the SIGs to showcase their knowledge and experience in systemic sustainability to the GLL membership, and we want the GLL membership to showcase their projects and models to the SIGs.

When we have these meetings, the idea would be to also invite universities to these meetings, as observes. They can observe potential MA and PhD projects for their students. Nam developed a course where students will get credit for going to a biosphere and doing an assignment which will help that part of the model in their specific location. It is not a thesis project, but it is a case study.

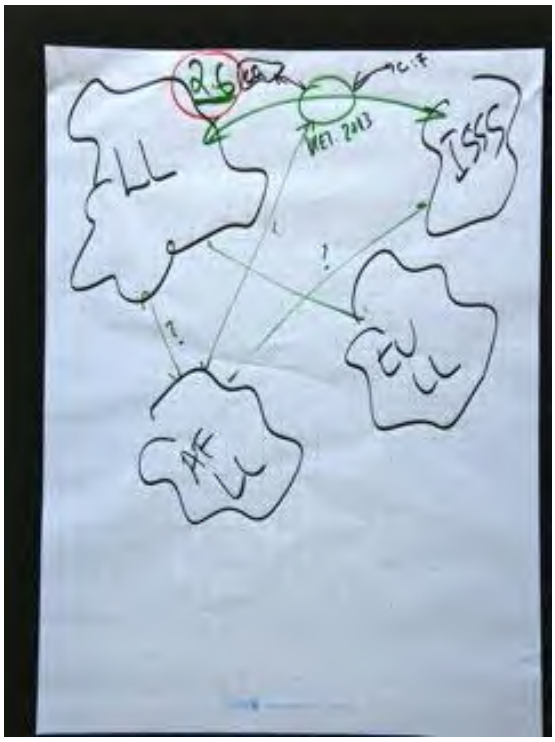
The type of outcomes we want from this are –

1. getting potential funders by grabbing their imagination
    a. famous botanists might be interested and could get royal funding
2. creating informal co-learning about systemic interventions (for thrivability)
3. supporting different 'small' communities (Cat Ba, a project in Cambodia, etc.) contributing to the global knowledge pool about sustainability
4. extension of the Llab concept to other parts of the world
5. getting R&D involvement by inviting systems thinkers from around the world to become involved in the Global LLab Net meta-project and specific systemic interventions.
    a. this will be made possible through the ISSS involvement
6. getting youth involved with the Eco-Policy game

a. we can run this at the event and the Malik said they would be happy to facilitate it

=== Lunch ===

Alex&er: If we take the framework/offer that Ockie outlined, and enrich it with the involvement of as many "show case" projects in systemic sustainability from around the world, then we have something to offer for ISSS2013. We could spotlight the inspirational cases from around the world and given them the opportunity to share with each other and learn from each other.

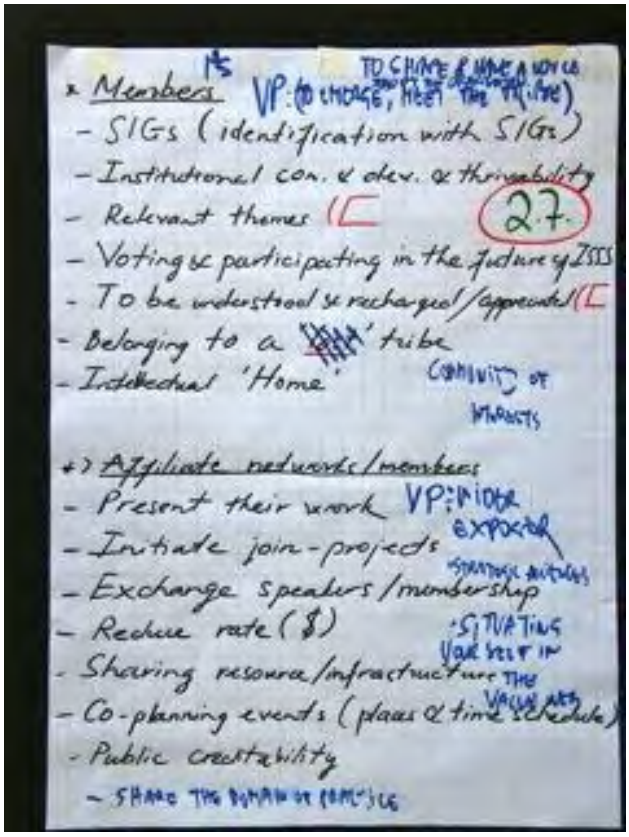


Ockie: the cases in this room are already rich and we should take them to the conference.

Violeta: this is the network of network framing that is very important, but we must always keep in mind that is the *individuals* involved in these networks that make the links and the change happen.

Stefan: CTG initiative is really a connector of initiatives rather than a project generator, itself. As such, it can help identify the players in the field, contact them, and also work on it so that they feel they want to come.

Alex&er: so we have catalysts, such as CTG, and attractors, such as the actionable vision of *curating the conditions for a thrivable planet through systemic leverage points for emerging a global eco-civilization.*



Violeta: let's begin designing the thing! okay, we need to identify the sub-set of stakeholders who are the core target participants of ISSS2013. The World Conference of the ISSS could attract:

- systems practitioners
- systems scientists
- legal entities
    - R&D institutes
    - SD
    - ASC
    - INCOSI
    - ANZSYS
    - UKSS
- ISSS members
- Children and youth
- Affiliate Networks
    - Salzburg Global Seminars
    - Change The Game
    - Giordano Bruno GlobalShift University

- InCo network
- China and Japan systems interests

⊙ Funding People

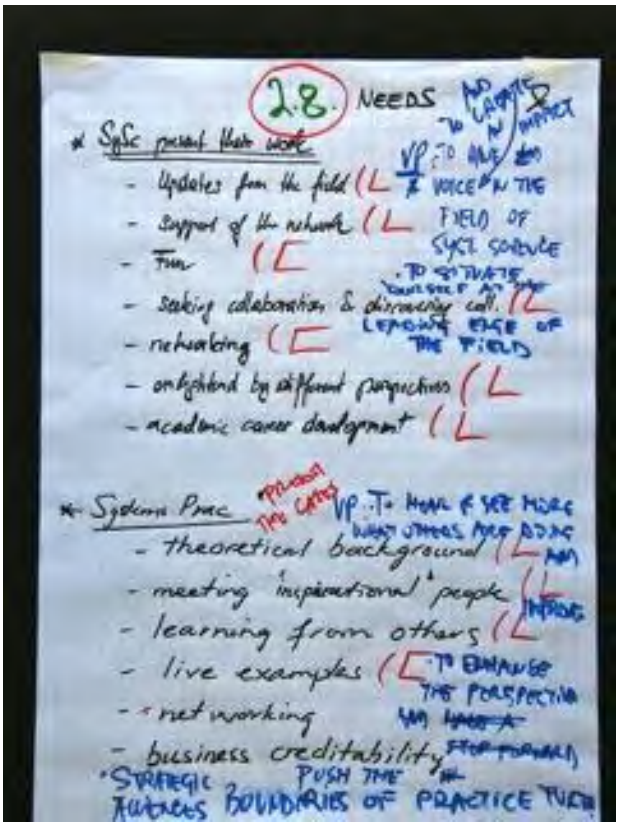
- business people
- philanthropists
- social entrepreneurs
- UNESCO
- Clinton Initiative

Stefan: now let's consider the Needs & Contents that would address these stakeholders, and the Structure & Scenario's that might be interesting to them:

<u>Needs & Contents</u>

o systems scientists
- venue to present their work
- updates from the field
- support of their networks
- seeking and discovering collaboration
- networking
- enlightened by different perspectives
- academic career development

o systems practitioners
- to get theoretical background in one's area
- to meet inspirational, like-minded, insightful people
- learning from others
- life examples
- business credibility



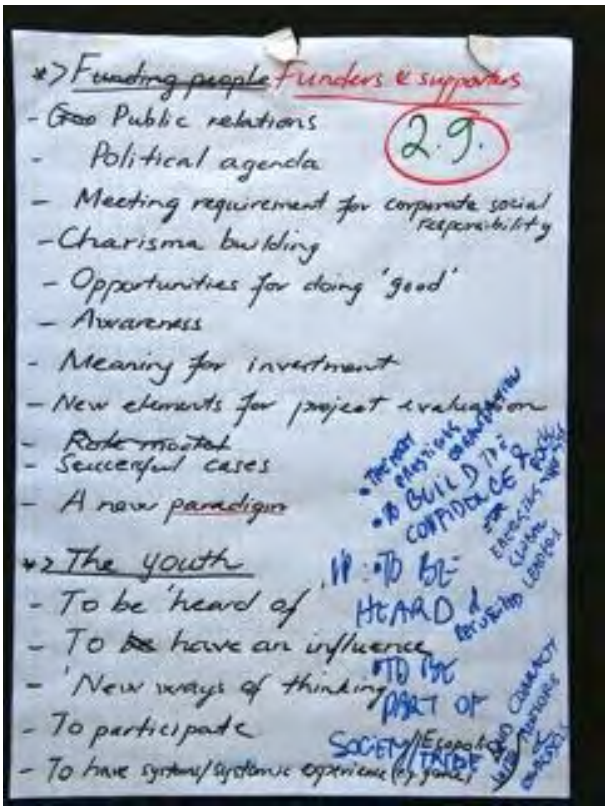
- members
  - institutional thrivability
  - relevant themes
  - voting and participating in the future of ISSS
  - identification with SIGs
  - to be understood and recharged/appreciated
  - belonging to a tribe
  - having an intellectual home

- Affiliate Network Members
  - present work
  - network with affiliate projects
  - to initiate joint projects
  - exchange of speakers/membership
  - reduction in rates for participation
  - sharing resources/infrastructure
  - co-planning events (places and time schedules)
  - public credibility

- funding people
  - public relations
  - political agendas

- meeting requirements for CSR
- charisma building
- opportunity for 'doing good' in the world
- meaningful investment opportunities
- awareness of emerging trends
- new project evaluation parameters
- successful cases
- linking old paradigms to new paradigm perspectives

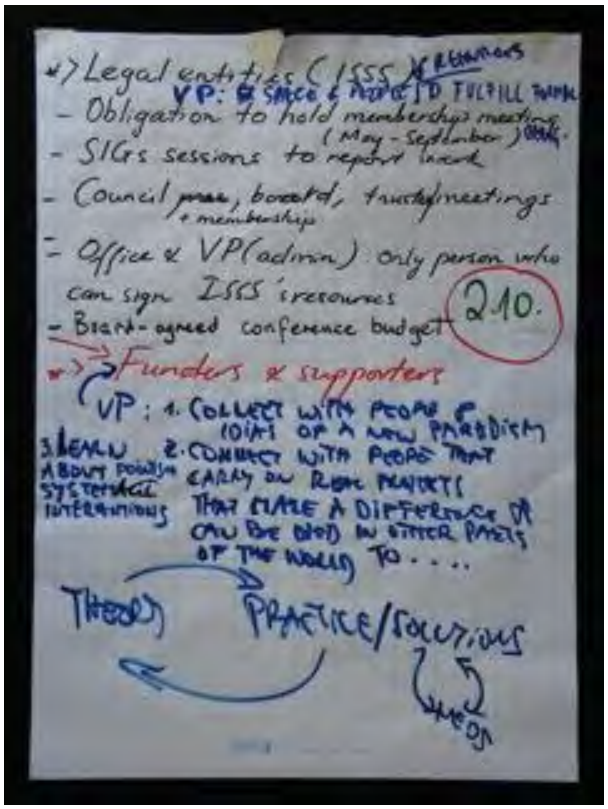
o youth
- to have a voice and to be heard
- to have an influence
- access to new ways of thinking
- to participate in the learning, design and application process
- to have systems/systemic experiences
    - o eco-policy type games



o legal entities (associated with the ISSS)
- obligation to hold members meeting
- SIG sessions to report work (May-September)
- Council + membership, board, trustees meetings
- Office and VP (admin): only person who can sign for ISSS resources

- Board-agreed conference budget

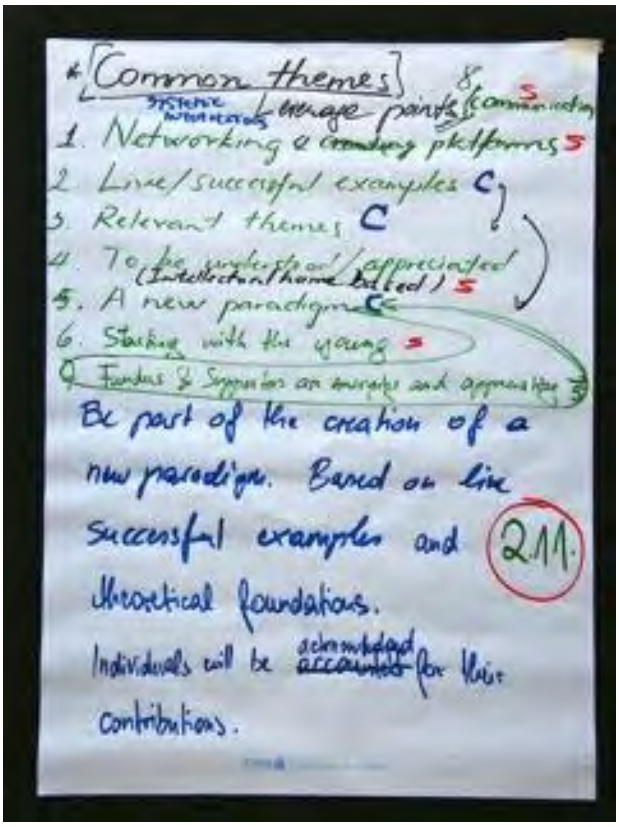
➔ include interests/needs of the list from Funders & Supporters, above



→ Value Proposition:

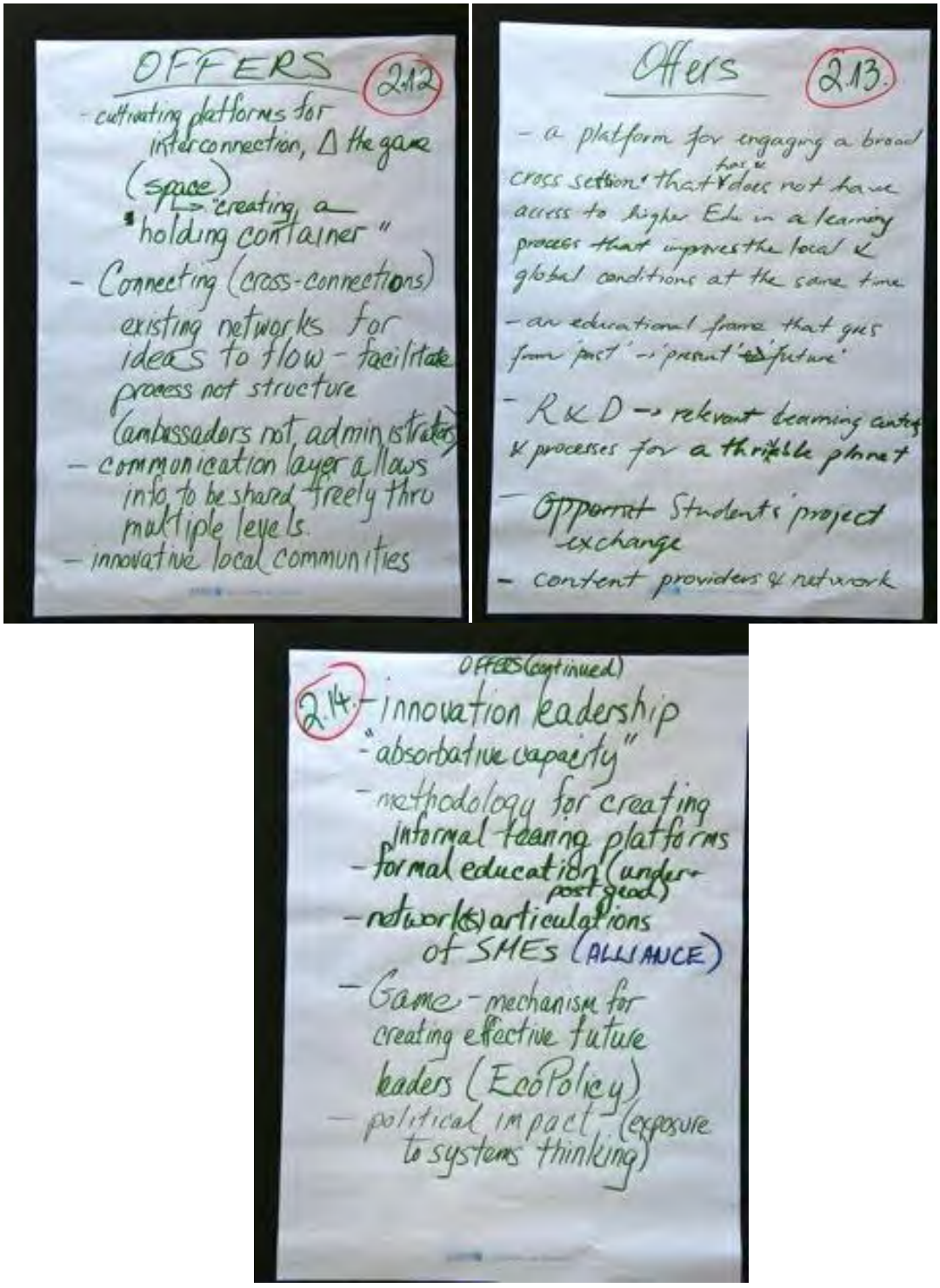
1. connect with people and ideas who hold a new paradigm
2. connect with people who carry out real projects that make a difference and can be used in other parts of the world
    a. match making systemic needs with systemic solutions
    b. supporting practice with theory and enriching theory with practical lessons
3. to learn how to identify systemic interventions points / learn how to perceive systemic sustainability / learn how to utilize systemic leverage points

<u>Common Themes among the needs identified, above</u>



1. Networking
2. Living case and successful examples
3. Relevant themes
4. Intellectual home base: the need to be understood and appreciated
5. Funders and supporters who emerge and appreciate new paradigms
6. Starting with the youth
7. Communication platforms

Be part of the creation of a new paradigm. Based on living cases and successful examples and the creation and application of theoretical foundations. Individuals will be acknowledged for their contributions.

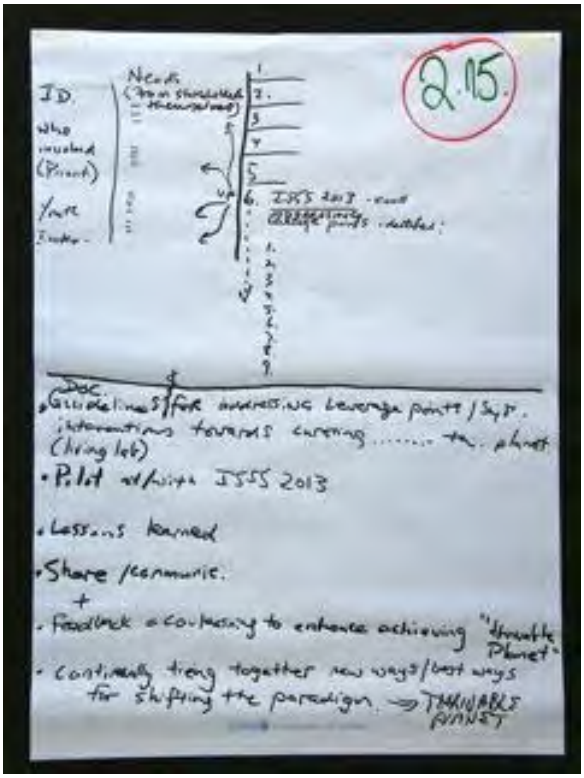


- contents
  - measuring and evaluating methods appropriate to the new paradigm
  - first session presents a case for the WHY of needing to curate the conditions for a thrivable planet
    +

- deals with what people are going to see
    + here is where you are going to see these real-life things – on Cat Ba, and here in Hai Phong, etc.

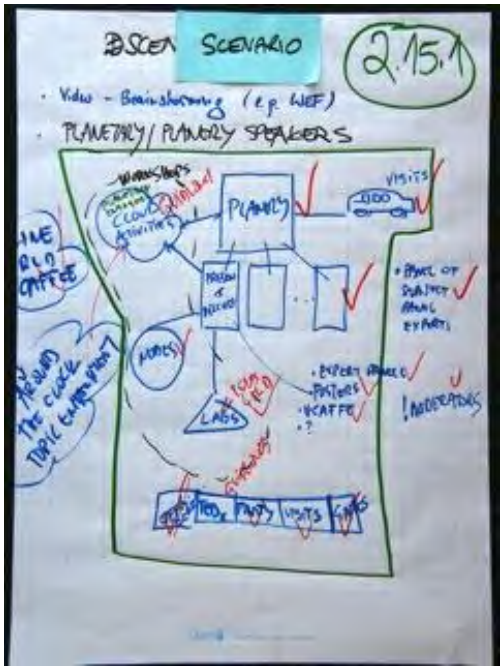
o scenario
    - video-brainstorming (e.g. World Economic Forum)

o structure
1. pre-conference
2. conference
3. post-conference



- to get really motivating speakers for the plenary sessions
- to create **nodes** where the theory people and the practice people meet to improve their process, foundations, models, etc.
- expanding existing projects and moving them into new areas through matching project in the Global **LLab** Network sort of thang…
- to offer an exhibition option through **posters** that allow for the show-casing of theory and practice
- side-events
    + visits – Cat Ba biosphere
    + games – eco-policy game
    + break-out sessions – information technology

- workshops – systems primer
- proceedings (now entirely online)
- presentations of living cases



- PARTNERS in the offer of ISSS2013:
    - ISSS (Jennifer)
    - Hai Phong (Lien in collaboration with Nam)

Logistics:

- one bus per day from Ha Noi to Hai Phong City (approx. 100 by train or coach)
- at least half a dozen flights from Ho Chi Ming City to Hai Phong City
    - continuous bus service from Hai Phong City airport to conference venue
- lots hotels conveniently located within walking distance of the City Convention Center (built last year). If you have to take a taxi, it's just 1 or 2 dollars.
    - on Hoang Dieu Street
- welcome reception, conference dinner, all lunches, tea, rooms and equipment provided free of charge
- day trip to Cat Ba island provided as well

Day 3:

George gave his summary and update from the previous day – tremendously helpful. He enriched the work with frameworks, references and perspectives of his own.

Alex&er: We should try to focus on a more balanced distribution of different ways of knowing from what conferences standardly focus on. There is a great framing for this that place them broadly into the four ways of knowing described by Heron and Reason in 1997[1]:

- *Experiential knowing* – learning through online forums, interactive chats, observation, reflection on personal experience.
- *Presentational knowing* – learning through movies, graphics and diagrammatic presentations, animations, expressive arts.
- *Propositional knowing* – learning through readings, lectures, writing.
- *Practical knowing* – learning through doing, participating, designing different types of projects (e.g., research inquiry, problem-based learning, project oriented learning, service learning).

Alex&er: we should keep these four types of knowing very present in the design process for the conference. Similarly, we should work on being sure to curating the following dimensions of consideration:

- ⊙ trans-generational
- ⊙ trans-cultural
- ⊙ trans-disciplinary
- ⊙ trans-temporal
- ⊙ inclusive frames of relational awareness (male/female, yin/yang, etc.)

[1] Heron, John and Reason, Peter (1997). A participatory inquiry paradigm. *Qualitative Inquiry*, 3(3), p. 274-294.

Violeta: so let's get back to finalizing the value propositions:

George: we are also looking for ways of learning about things, not just presenting them. The packaging of our offer is very important.

<u>value propositions</u>

- legal entities (completing the entry from pages 23-24, above)
  - finding people, providing resources, and creating space to fulfill formal obligations

- members (from page 22)
  - the idea of belonging to a 'tribe' relates to the notion of celebrating one's community of interest
    - + also thinking about this within a domain of practice
    - + include and highlight greater relational awareness
  - shaping and having a void in the organization
  - emerging and constituting the tribe

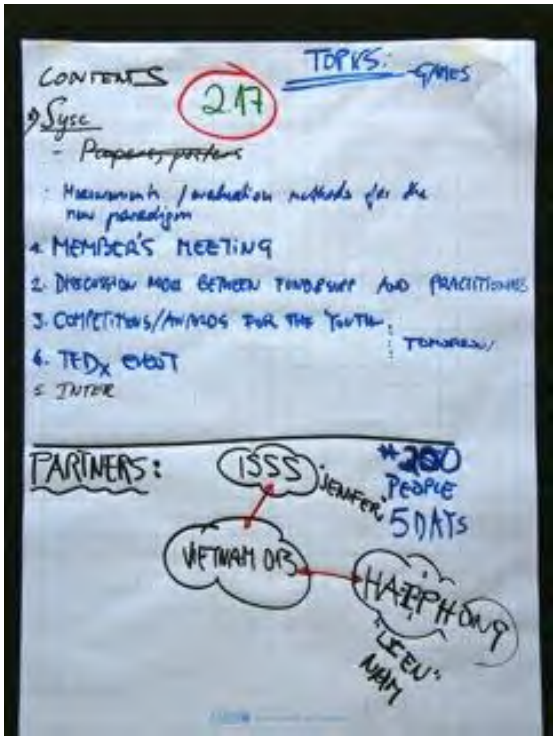
- systems scientists (from page 21)
  - to have a voice and to create an impact in the field of systems science
  - situating oneself at the leading edge of the field

- systems practitioners (from page 21)
  - to improve and enhance my own services
  - seeking to form strategic alliances

- push the boundaries of my own practice

o affiliate networks/members
- gain wider exposure and recognition
- situating yourself in your professional value web

o youth/students
- to build confidence
- to be heard
- to be part of the society and feel like a member of the tribe
- to identify role models and mentors
- to have a fun engagement that increases my social capital
- to be a part of a prestigious
- to be provocative heralds of change; to rock the system
- to flaunt my awesomeness and have it recognized
- opportunity build confidence AND rock the system - awesome!
    + to maximize that value, it will be essential to open pre-conference conversations with youth groups that have already embraced an evolutionary perspective



George: a meta thought — through this type of interaction between the group in Linz and me in London, we are also building/contributing to a field of collaboration practices engaging groups at multiple location using both sync and async modes of communication, modalities (audio, video, text), and multiple media channels and

software tools. If feels like I'm dipping into the ocean of wisdom expressing in the experiences that each participant brings to the group, dive for a gem, then surface back to this screen, where I'm jotting down ideas/inspirations that it evokes. it's like being in a jazz band and enjoying ensemble playing.

Violeta: why not invite TED Talks – maybe TEDx Viet Nam – to be part of the one major evening event at Vietnam2013?

George: can we get funds for supporting ISSS2013 with an ecosystem of "collective intelligence" tools and methods? If we had a possibility to apply state-of-the-art thinking and practices in augmenting the collective intelligence of ISSS2013 attendees, then we could create a huge breakthrough! This would require a concerted *crowd funding* initiative.

Alex&er: how about using the global nature of the living lab we're seeking to emerge as a web of nodal relationships as a show-case for the ISSS. We could take a one of the ISSS sessions and send it around the world through different time-zones for others to work on between days of the conference.

George: fomenting around the clock virtual work teams in businesses - as an example for how ISSS2013 can benefit from global input. We could offer technology companies to benefit from our trailblazing application of existing/emerging collaboration technologies.

Violeta: we could get *Planetary Speakers* who work on enriching the output from one day to the next from other parts of the world, and they could offer asynchronous and virtual counter-parts to the *Plenary Speakers* at the conference each morning.

Resource for collaborative and participatory creative design work (like we're doing here), in a way that includes local and distant people: http://www.comapping.com/

Mind-mapping tools to consider:

- http://debategraph.org/home
- http://discoverycast.com/
- http://www.comapping.com/ - the one George recommended.

also, there is http://freemind.sourceforge.net/wiki/index.php/Main_Page and http://en.wikipedia.org/wiki/PersonalBrain and http://en.wikipedia.org/wiki/XMIND, all of which are good and need to be considered, too.

… and topic map, concept map, Compendium, iCohere, etc.

Day 4:

Taking Stock —

Ockie: we have material for inviting the right people and value proposition for attracting them. We also have some loose ideas around events and presentations and such. That, I believe, is where we need to focus now. We need to identify the different things we can do to help as leverage points toward the objective of Viet Nam 2013. The big goal is the Thrivable Planet. We have identified the needs related to this goal, and the people most likely to be involved in addressing them. We have then decided that we are going to do one thing to do this, ourselves: we are going to have an ISSS2013 event. From this, we considered what the *value propositions* are that we can offer toward the toward the Thrivable Planet objective.

Alex&er: so there are three aspects to the emerging guidelines we're seeking to offer –

1. documenting the guidelines for emerging a global interactive initiative for a ecology of institutions and initiatives that emerge a thrivable planet
2. providing an experiential basis for feeling what it would be like to be a part of an initiative like this
3. pointing to (in very pragmatic ways) a living model of an eco-system of initiatives for collaboration around systemic sustainability.

Violeta: shared responsibility for the larger process of emergence *only works* if/when there are individuals responsible for making things happen. It won't just happen by itself.

Alex&er: we can think of setting 'initial conditions' as a *push* for the emergence of global systemic process of project collaboration for curating the emergence of a thrivable planet, and seeding 'attractors' as a *pull* for engagement in the process for continuing tying together new ways and best practices for shifting the paradigm toward a thrivable planet.

Ockie: we can think about how the ISSS Council might make a permanent and ongoing commitment of the ISSS to promoting global action systems for sustaining and advocating a systemic thrivability agenda.

Violeta: we already have a wonderful set of emerging alliances and collaborative actions among the people and institutions represented here in this room, just by all of us. The challenge, from a practitioner point of view, is that this is great and just what we need, but it must be managed by individuals. We need to set up a repository where we can read and share all that we are doing and coming up with. This is in addition to having an annual meeting of this group (even if it were in direct conjunction with the annual ISSS meeting).

Ockie: so let's move into action, already! One of the things on the program that I would like to see is an inter-generational learning event. So let's capture these sort of things on a list of actionable items, starting with a consideration of the conference event, itself.

ISSS 2013 Conference Content ideas (from the bottom of page 26)

1. Plenary Sessions – one per day for four days (Mon-Thurs) + Friday closing plenary
2. Pre-conference activities
    a. workshops and special offers
    b. opening reception (Alexander, Ockie, Jennifer, Nam)
3. Day 1 – focus on Presentational Knowledge
    a. Wednesday Plenary showcasing systemic sustainability projects from around the work networking discussion
        i. the idea would be to do a Progressive Plenary with both local and international project presentations as we move through the different areas of Cat Ba (much like what was done at the Salzburg Innovation Seminar of CTG in 2010)
    b. Opening Plenary and Welcoming Ceremony – Monday 9am
        i. Dr. Thanh + ministers (10 mins – Nam & Alexander)
            1. Address (formal)
                a. Dr. Thanh (90 mins – Ockie & Nam)

b. Alexander (90 mins)
    i. thrivability
    ii. leverage points
    iii. systemic sustainability
    iv. tie to 2012 focus (service systs/nat systems)

c. Tea Break – 10:30am (30 mins)
    i. Two (2) speakers (40 mins + 5 mins Q&A each)
        1. Ockie Bosch (Ockie & Alexander)
            a. on how this conference does what Alexander says
        2. Speaker on how Systems Scientists can meet this challenge (possibly Ervin)
            a. overview
            b. *relevance*
            c. inclusive of many points of view
            d. SS2 orientation
            e. Call to participation/action

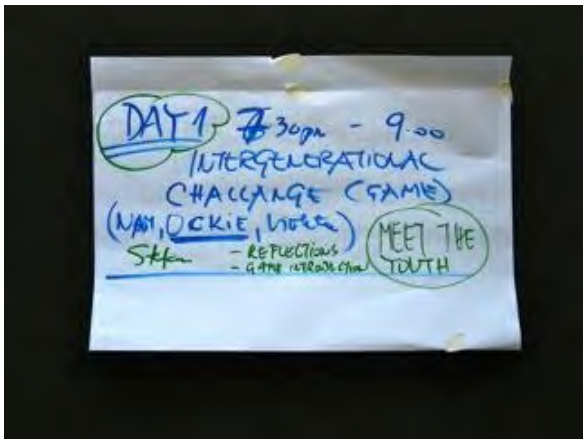
d. Lunch (12:30 – 60 mins)

e. Break-out session (1:30 – 90 mins)
    i. Intergenerational Challenge Game (youth) (Nam, Ockie, Violeta)
    ii. Meet the Youth – organize the session *with* the youth
        1. explore the issue of Thrivable Planet, etc.
    iii. give each student a copy of Eco-Policy

f. Break (3:30)

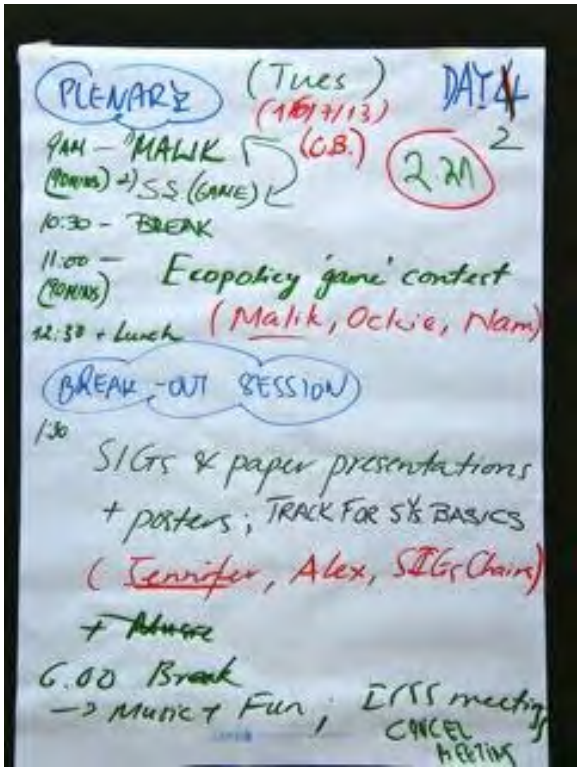
g. Break-out session (4:00 – 120 mins)
    i. SIG and paper streams (Jennifer, Mary, Alexander, SIG Chairs)

h. Break (6:00)

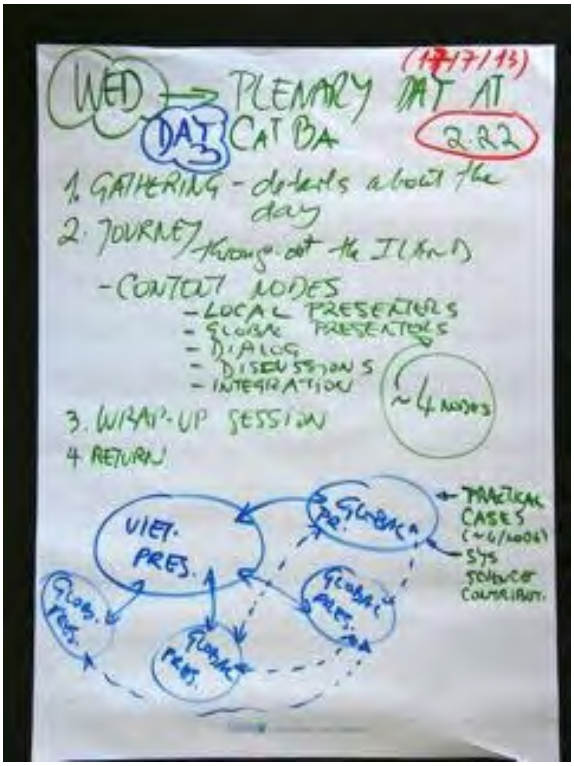


i. Evening Session – Intergenerational Challenge (game) (7:30-9:00pm – Ockie, Nam, Violeta – with Stefan)
    i. students play game
    ii. ISSS Board Meeting
    iii. Improvisational Participatory Arts event (Alexander, Lien, Judith)

4. Day 2 – focus on Practical Knowledge



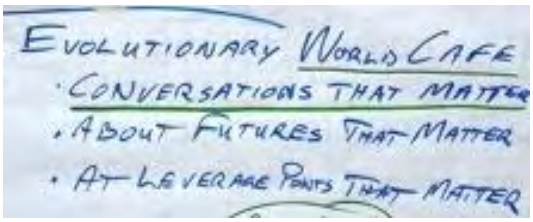
   a. Plenary (9am - 90 minutes)
      i. Systems Scientist who addresses gaming need and power
      ii. Malik who addresses specific example (Ockie)
   b. Break (10:30)
   c. Eco-Policy Game contest (11:00 – 90 mins – Malik, Ockie, Nam)
   d. Lunch
   e. Break-out session (1:30)
      i. SIGS & Paper Presentations plus Posters
         1. track for systems basics (Jennifer, Alexander, SIG Chairs)
   f. Break (6:00 pm)
   g. Cultural Evening
      i. Music + Fun
      ii. ISSS Council Meeting
5. Day 3 – focus on Experiential Knowledge



a. Cat Ba progressive plenary process (Nam & Ockie)
    i. Gathering – details about the day
    ii. Journey throughout the island
        1. Content nodes – 4 nodes
            a. local presenters
            b. global presenters
            c. dialogue
            d. discussions
            e. integration
    iii. Wrap-up session
    iv. Return to conference site and hotels

6. Day 4 – Focus on Propositional Knowledge

a. Opening Presentation – Key Official (9am – Alexander)
    i. who understands what we're doing
    ii. who can present/discuss leverage points
    iii. who are successful
        1. E.g., Bill Gates/Gates Foundation, Georg Soros, Richard Branson, CEO STAR Alliance
        2. always plan with back options
b. Roundtable with Funders, Supporters, Investors
c. Break (10:30)
d. Case Examples from Funders and Supporters
    i. VINNOVA (proactive investment sort of orgs) (Violeta)
    ii. STAR Alliance (Ockie)
e. Break-Out Sessions (1:30pm)
    i. SIGs, papers, Systems Basics track(s) (Jennifer, Alexander, SIG Chairs)
f. Break (3:30)
g. Evolutionary World Café – focus on propositional interaction (4:00 – Alexander)
        a. conversations that matter
        b. about futures that matter
        c. at leverage points that matter

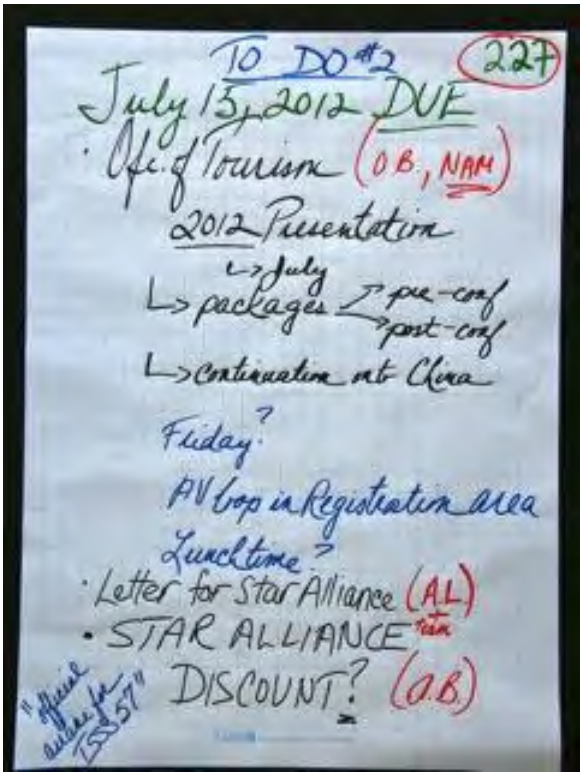


   h. Banquet and Awards
      i. ISSS Vickers and Rapoport awards
      ii. Eco-Policy award
      iii. Host (Viet Nam) award
         1. present(s) for Dr. Thanh (Ockie, Nam, Alexander)
   i. Past Presidents and Student SIG reflection and visioning dialogue
7. Day 5 – closing and launching

      i. Student Presentations (Vickers and Rapoport winners) (9am – Mary, Alexander)
      ii. SIG reports (Violeta, Mary, Alexander)
      iii. Host Appreciation – formal thanks
      iv. President's Wrap-up (Alexander)
   b. Break (10:30)
   c. Incoming President's Address (11:00am)
   d. Membership Meeting (12noon)

Conference Preparation activities

- Guideline paper (Alexander and Ockie)
- Tourism options (see Post Conference activities, below)



Post Conference activities

- Paper for proceedings (Alexander and Ockie)
- SIG follow-up
- Tourism activities – especially with a week between ISSS & ASC in China (Ockie and Nam)
    - make a presentation about tourism options at ISSS2012
        - possibly on Friday
            - at lunch time
        - AV presentation in the Registration area running on a loop
        - *designed and set up by 15 July 2012*
    - design packages from Viet Nam Office of Tourism
        - for pre-conference (long and short tours)
        - for post-conference (long and short tours)
    - STAR Alliance discount (Ockie)
        - setting them up as “the Official Airline of ISSS ‘57”

Functional Domains of Responsibility of this team:

- Executive Actions + ISSS Admin issues ➔ Jennifer
- Project Workflow ➔ Mary (plus ISSS Head Office through Jennifer)
- Logistics (esp. in Vietnam) ➔ Nam
- Executive Decisions and Thematic orientations ➔ Alexander (with Jennifer)
- Marketing strategy ➔ Stefan and Violeta – but only in terms of what coordination of others
- Web presence ➔ Stefan – but only with ideas and coordination others

=== afternoon session ===

Stefan: there are limits to the amount of attention and engagement some of us can give to this sort of project. We have to attend to our professional concerns, too, and it may turn out to require that we push this (ISSS2013) activity to the back of our activities. We simply will not be able to participate very actively if we don't have the financial means to support our livelihood.

Alexander & Ockie: Don't worry. Be happy.

Cross-checking outcomes

☒ Plenaries

- ☒ visits and tours
- ☒ Posters
- ☒ World Café, expert panels
- ☒ Lab (set now as one full day)
- ☒ Nodes (with meetings of different network stakeholders)
- ☐ Moderators – session chairs
- ☐ Reporters – synthesizing and distilling key points from each session
- ☐ TEDx Viet Nam – more appropriate for the Guidelines than for ISSS2013
- ☒ parties
- ☒ games

Value propositions check

- ☒ members – to shape and have a voice about future dev
- ☒ affiliate networks/members – wider exposure to share
- ☒ systems scientists – to have a voice and create impact
- ☒ systems practitioners – to push boundaries and create alliances
- ☒ funders and supporters – connect with people of leverage
- ☒ youth – to connect with mentors and role and rock the world
- ☒ legal entities – to have space to fulfill obligations

Pending tasks to be put into our project work-flow (Mary)

- ☐ Sub-themes for each of the days of the event – Alexander
- ☐ Trans-cultural activities and experiences – Nam and Ockie
- ☐ Letter that describes what this conference is about – Alexander

George's contribution on ways of augmenting the collective intelligence of ISSS2013:

- ⊙ Purpose
  1. To create a breakthrough in advancing the theory and practice of global learning systems, while benefiting all (individual and collective) participants from its evolutionary advantages.
  2. To seed a global network with an ongoing link to the IFSR, ISSS, and other co-founding supporters, empowered by a web-enabled innovation ecosystem optimized for augmenting of the CI of all nodes and the ecosystem as whole
- ⊙ The idea would be to prototype and apply a CI-enhancement platform that in integrates state-of-the-art thinking, tools, and methods for augmenting collective intelligence of ISSS2013 attendees and stakeholders.

In his document called "Augmenting the Collective intelligence of ISSS2013" (file: "Augmenting the Collective intelligence of ISSS2013.docx" in the Linz Material dropbox folder under "Updates from George"), George outlines five proto-typing case opportunities.

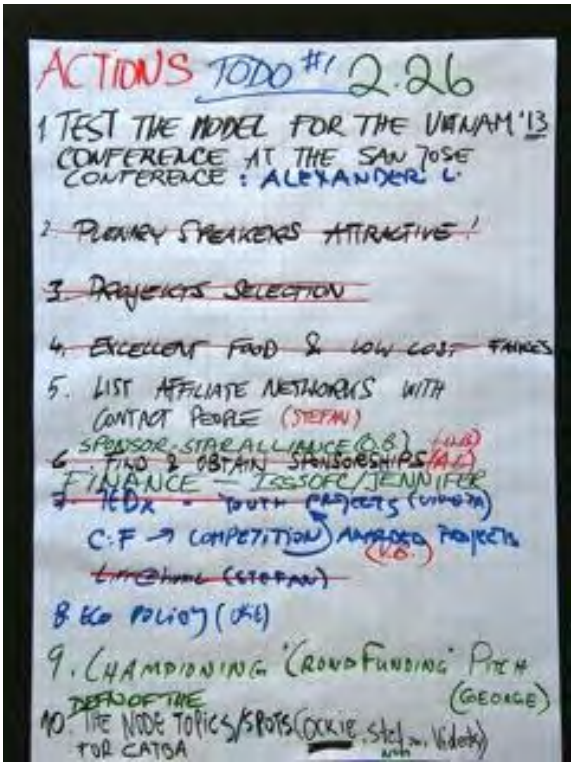
Once we become clear on which of the proto-types will be a go (and there may be several), then we would need to overlay it with the design we have already made for the conference itself.

Violeta: George could be the Chief Architect for the CI initiative of ISSS2013. He would cruise around the conference and see what is emerging in terms of the collective intelligence, and at the end of the conference would share the emerging infrastructure for the collective intelligence involved in the meta-project of curating the conditions for a thrivable planet. His tasks would involve:

1. drafting the design of the emerging collective intelligence architecture
2. coming to the ISSS2013 conference in Viet Nam
3. observing the behavior and role-out of the conference
4. propose the evolutionary approach for bridging beyond ISSS2013 to the meta-project of the Global Living Laboratory Network that follows it
5. present his observations on Friday
6. discuss his observations with other ISSS members on Friday
7. team deploys what we can – share the concept with the members of the Linz team

Collective and Individual “To Do List” (Mary) —

[see ‘Conference Preparation activities’ and ‘Post Conference activities’ on p. 25]



- Test the model for the Viet Nam 2013 Conf at the San Jose 2012 Conf – Alex&er
- List of affiliate networks with contact people – Stefan
- Find and Obtain Sponsorships – Jennifer (with Michael Singer)
    - Finance Officer for ISSS to be taken on by Michael (most likely) at ISSS2012
    - STAR Alliance connection – Ockie
- Challenge Future connection with Eco-Policy game – Violeta (CF) E-P (Ockie/Nam)
- Championing “crow funding” pitch – George
- Definition of the node topics/spots on Cat Ba – Ockie, Nam, Violeta and Stefan
- Gaming Resources/Speaker – Stefan with Alexander
- Find an engaging keynote speaker from business – Stefan with Alexander
- Enhance affiliate networks – Stefan, Ockie and Alexander
- Project workflow and planning – Mary
- Communication facilitation – Mary
- Introduction of local (Viet Nam) organizing committee to the ISSS Office – Nam
- Formal establishment of the International Organizing Committee – Alex&er
    - all team members propose their own official titles – EVERYONE
- Preparation of Tourism Presentation for San Jose – Nam
- Arrange and organize photo-gift for Dr. Thanh – Nam with Lien
- Systems set-up for ISSS (papers, registration, etc.) – Jennifer
- Hand-off of Vickers/Rapoport awards at ISSS2012 – Alexander with Jennifer
- Award for Eco-Policy game – Ockie


TO DO #3 2.28
GAMING RESOURCES/SPEAKER? (STEFAN A.L.)
ENGAGING KEYNOTE SPEAKER (STEFAN A.L.)
ENHANCE AFFILIATE NTWKS (STEFAN A.L. O.B. J.W.)
PROJECT PLAN (M.E.)
COMMUNICATION (M.E.)
INTRO ORG. COMMITTEE (local) to ISSS OFC. (NAM)
TEAM APPRECIATION (roles) (A.L. ALL CITIES)
TOURISM PRESENTATION FOR SAN JOSE (NAM)
PHOTOGIFT (NAM, LIEN)
SYS. SETUP ISSS (PAPERS, REG) (J.W.)
TO DO #4 2.30
HANDOFF - STUDENT AWARDS AT SAN JOSE (A.L., JEN)
AWARD - ECOTOLICY (O.B.)
- INTERACTION POINTS
- MAIN TERMS / ROLES
- THE PROCESS / STEP
PEOPLE
STRUCTURES
TECHNOLOGIES
TO DO #3 2.28

Team 3:

Convergence for a Commons-Based Economy

Overview of launch program
London, May 7-18, 2012

James B. Quilligan, USA

In reviewing the list of topics for The Convergence for a Commons-Based Economy, it's clear that each of the presentations in this series is different. While each of the seminars may be unique, they are not discrete or unconnected segments. The greater thematic unity which interlinks them is essentially a "commons of the commons". More than anything, this is a worldview which calls us to rebuild and restore our Beloved Commons.

The presenter of these seminars is James Quilligan, Chairman for the Secretariat of Global Commons Trust and Managing Director of the Centre for Global Negotiations. He has served as policy advisor and writer for many international politicians and leaders, including Pierre Trudeau, François Mitterand, Edward Heath, Willy Brandt, and Jimmy Carter, and as an economic consultant for government agencies around the world. He is currently collaborating with Prince El Hassan of Jordan and several United Nations agencies on global commons issues.

Those who have chosen to emphasize a particular view of either the *social good* or of *individual rights* have generated an enormous political polarity. The ideal of mass equality has led to homogenization and uniformity of society and submission under omnipotent governments. People today find little value in participating in forms of political decision-making which are merely demonstrative and not substantive. Extreme emphasis on the collective good has undermined the traditional commons because few people identify with the local political units that are carved out essentially to perpetuate social hierarchies and secure our complacency. As the saying goes, "the system is not broken, it's fixed". Likewise, the ideal of mass freedom has become an empty vessel, offering no means for people to identify with their local commons. Instead, it has empowered the rise of zealous minorities with the vision of militant nationalism and totalitarian ideologies. These reckless programs depreciate and crush the individuality and diversity that arise from the commons, uprooting people and destroying their traditions and means of livelihood. This duality between the ideals of social equality and political freedom discourages personal and social reconciliation, the transformation of our communities and the creation of a commons-based economy. Instead, our moral will and creativity are suppressed. Mind and body are seen as separate units. Our being is split from our actions. Our common purpose is lost.

For those seeking to overcome this alienation through a Third Way, the problem is that in attempting to combine the common good and individual rights in a neutral fashion (by not emphasizing one over the other), a very strong kind of relativism has resulted. This polarity is not transcended through the autonomous and dynamic countervailing power of the people. This is because our middle path for social alternatives is passive rather than active and creative. We have not fully recognized that the society which sees itself as an inevitable polarity between the social good and individual rights destroys the forms of life that are rooted in the commons, leaving us with the false dichotomy of cooperation Vs. competition. Without a sense of the indivisibility of human existence, the modern ideologies of collective rights and individual rights are both devoid of the realization that people take part in a variety of commons which are the source of our livelihood and well-being. This has left us starved for the equality and freedom which express the interrelatedness of human life and which arise only through our commons.

Yet all of this is changing now as a result of the commons movement. The Quilligan Seminars address various facets of these commoning activities. *Commons and Complexity* (16 May) describes the most irreducible fact in economics -- that resource systems may either be depletable (natural, material) or replenishable (natural, solar, social, cultural, intellectual, digital). This means that economists -- and all of us -- need to be looking at the complementarity of the stocks and flows of resource systems for a better indicator of sustainability in a world of disequilibrium and instability. In refusing to affirm a preference for the common good or the rights of the individual, while seeing both as important but imperfectly expressed through the Market State, we are creating a framework that is neutral among ends but highly transformative. *Political Economy and the Inclusive Commons* (8 May) examines how the aggregation of the social good and the radical atomism of individual rights have both eroded the meaning of citizenship and communities. It describes the commons as a third sector that can create a more beneficial balance in society, bringing people a new form of political power. *The Law of Rent* (9 May) also demonstrates how the principles of Henry George and Peter Barnes may be applied to a commons-based economy, creating a far more representative balance of power and wealth between the commons, business and government than currently exists. In this vision of a new society, private industry provides the public with goods and services which are produced from the surplus resources rented from commons trusts. Government then recycles these rents as social dividends for the public and as funds for the preservation and regeneration of the commons.

Of course, a new political and social balance is not possible unless the public life of the commons expresses the deep ontological structure that is missing in the Market State. *Democratizing the Global Political Commons* (7 May) describes the units and scales of political accountability that are necessary for post-liberal forms of multilateral cooperation, a new international economic system and the creation of a democratic confederation of world citizens. In realizing this ontology for restoring the local and global communities through our commons, a new kind of collective value must arise. *Commons and the Roots of Society* (15 May) describes how the global commons -- material, natural, genetic, social, intellectual, cultural and digital -- provide a range of assets that can create the reserve base for a new global monetary system and standard of value. This, in turn, would create a new dynamic in the world of business and finance. *Financial Innovation and the Commons* (10 May) describes how the modern economy can be reconceived as a subsystem of the biospheric commons, providing the long-term signals and incentives (through ecological, energy and exchange rate stability) that businesses are presently seeking.

This new society rests upon a non-polar framework which does not make the common good more important than individual rights, or individual rights more important than common good, but recognizes the mutual importance of both. We can recover the meaning of citizenship and community -- which has been lost through the corporate economy and the bureaucratic state -- by focusing on the production and management of our commons. *The Great Transition and the Commons* (14 May) describes a new epistemology of resource sovereignty, shared responsibility and legal accountability which recognizes the moral and political legitimacy of people’s rights to preserve,

access, produce, manage and use their own resources. It demonstrates that all individuals take part in a larger life, since human beings are vitally dependent on one another. No person is either completely socialized or completely separate -- everyone has both qualities of existence. *Trusteeship and the Commons* (17 May) describes how trusts can express this understanding through a methodology and political mechanism for the management and valuation of society's common goods. These trusts preserve the commons for the benefit of both present and future generations.

As a politically organized community, the commons express the self-sufficiency and indivisibility that underlie society and nature. The commons are a community which, like a living organism, resolve the polarizing distinction between means and ends. There is no difference between what is and what ought to be. Being and doing are one. In this way, *Economics and the Commons* (11 May) demonstrates how self-organizing communities transcend the traditional division of labor by allowing resource users to become directly involved in the process of production. *Crowdfunding and the Commons* (12 May) also describes how deriving value through the 'wisdom of crowds' has the potential of involving resources users in the process of producing their own resources, thereby generating new forms of value, cooperation and trusteeship. Since each of us has roles defined by our communities which are deeply embedded in their collective accountability structures, the commons provide the basis of the individual rights and obligations that already exist in the social good. This greater good is achieved by individuals working collectively on a voluntary basis -- freely offering one's labor for the social benefit.

Covenant Stewardship and the Inclusive Commons (13 May) examines the spiritual dimension of the commons. This is the vision of a completely integrated society, a community of love and justice where brother and sisterhood are realized through all of social life. Ultimately, harmony and cooperation between nations is achieved only through the advancement of culture. It is not the competition for resources that we seek, but the demonstration of our common ideals and notions of what it means to be human. The set of practices and institutions which comprise the public life of the community, expressing the norms and purposes essential to the identities of its people, are sustained only through their participation in these practices and institutions. This involves personal and social relationships that cannot be legislated, but are created through love. All evolutionary activity is produced, not through individualism, but collectively. Evolution emerges through the dynamic of the group expressed by individuals acting together but also voluntarily. Whatever the collective action is attempting to generate, if human free will is not involved, the social good will not be realized because the individual is not invested in the outcome.

Convergence for a Commons-Based Economy (18 May) is an attempt to provide broader thinking among the seminar conveners and the public on a *commons for the commons* -- not a set of solutions, but a process for reaching such solutions. Obviously, these are deeply challenging and momentous questions. How do we overcome our alienation and revitalize the democratic possibilities of a shared public life? How do we recover our autonomy and return to the norms of a differentiated society and the moral

obligations of the community? How do we identify and engage with the decentralized federation of communities producing and organizing their own resources as in the past?

Reality is comprised of structures that form an interrelated whole. Yet our common practices and institutions are not embodying the kinds of goals, norms and ends which manifest that whole. The public expression of society no longer has genuine meaning. Individual rights can be achieved only through the ethical norms of the social good embodied in a community where the individual can realize the moral possibilities that are already there, however distorted or repressed these may be. The commons recognizes the dichotomy between individuals as the sum of their desires and ends (through the common good) and the individual being who is free to make choices independent of those desires and ends (as in individual rights). This shows how deeply the commons are embedded in the human networks of mutuality and the means of attaining this intergroup and interpersonal living through nonviolence. The interrelatedness of the commons transcends differences in tribe, race, class and nation, demonstrating that whatever affects one person affects everyone. An injustice in one place is a threat to justice everywhere.

The commons recognizes that the politics of the common good and the politics of individual rights are both important, but have become highly distorted by the communities of power in the market and the state. The commons reveal how the Market State expresses a worldview in which people are considered more like behavioral animals than transcendent spiritual beings. It shows that the lack of cooperation between the material and spiritual worlds is the basis of all economic and political dysfunction. By revealing that individual existence is social in nature, the commons create a new sense of community among the nations of the Earth that is sustainable and supports the spiritual advancement of individual people. The task is ultimately to reconcile the mind and the body and return to a state of oneness with our source. Our Beloved Commons are both the state of individual being and the collective state of the world. Individual rights and the social good are integrated through personal participation, in solidarity with the human family, to rebuild the commons and restore the peace and tranquility of the world.

Philadelphia
April 1, 2012

Towards a Common Language for Systems Praxis

notes from Team 4 Conversation
April 14-19, 2012

These meeting notes identify some of the broad range of terms and concepts that practitioners and researchers in systems disciplines encounter during the course of their endeavors. It is precisely this broad range of terms and concepts that has made comprehending the totality of their inter-relationships so difficult—particularly if the goal is to achieve sufficient comprehension to craft a suitable ontology for the union of these disciplines. These notes document a contribution to that effort.

An expandable, graphic outline of these notes is available online at:

http://go.comapping.com/comapping.html - mapid=116868&publishKey=obkw5h8s06

- Day 1
  - what is common?
    - barrier free
      - boundary
      - money
      - language
  - language
    - natural language
    - invented languages
      - natural language vs invented language
      - invented language based on natural language?
      - LOJBAN
        - a constructed, syntactically unambiguous human language based on predicate logic
    - spoken (or sung)
    - written
      - Kanji symbols
      - Do certain writing systems encourage "abstract thinking"
        - Mathematics as a language
          - Many blind mathematicians, few deaf ones
    - English enables science, Chinese does not
    - mathematical language $/ne$ spoken word
      - discrete time expressions in math more difficult than in spoken word
    - sensemaking [Note: Bud's book Ch. 5]
      - How meanings and understanding of situations, events, objects of discourse, or contextual information are produced and represented in a collective context.
  - praxis
    - Skill is manual, physical ability
  - standards
    - common language for systems praxis
    - incentivizing
    - what is a praxis
    - common praxis for systems language
  - common mental models
  - shared vision
  - team learning

- systems thinking ties these together
- avoiding blivets (blivet = 10 pounds of s**t in a 5-pound bag)
- complexity
    - concept-to-chaos
    - essential vs accidental complexity
- express concept in metaphor
    - Mac = Toaster
    - software circuits uses analogy of hardware in constructing deterministic software
    - marketing: literary use of language
        - how you tell a story
- meta-language
    - means of language representation
        - alphabet based
            - Western languages
        - symbol based
            - mathematics, graph grammars
        - character based
            - Eastern languages
        - sound based
            - music
            - spoke word
        - patterns of expression
            - logic of the expressive form
- purpose
- how to bring better thinking to bear on bigger, broader problems
- recognize what is common; what is not common; find essential commonality
- system word holds promise
    - but may not capture all that we would like
- religion: heroes, legends, symbols, rituals
- five ways to learn
- languaging the project: principles and concepts

- Day 2
    - a common language for systems praxis
        - needs to span the 3 belief systems
            - Science
            - Humanities
            - Design
    - Culture [Note: per N. Cross. Designerly ways of knowing. Design studies, 3(4):221–227, 1982.]
        - Science
            - focus [Note: phenomena noumena]
                - Natural world
            - methods
                - controlled experimentation
                - classification
                - analysis
            - values
                - objectivity
                - rationality
                - neutrality
                - concern for "truth"
        - Humanities
            - focus [Note: phenomena noumena]
                - Human experience
            - methods
                - analogy
                - metaphor
                - criticism

        - evaluation
    - values
        - subjectivity
        - imagination
        - commitment
        - concern for "justice"
- Design
    - focus [Note: phenomena noumena]
        - Man-made world
    - methods
        - modeling
        - pattern-formation
        - synthesis
    - values
        - practicality
        - ingenuity
        - empathy
        - concern for "appropriateness"
- alternative labels
    - problem solving approaches
    - belief systems
    - cultures
- ISO 25010
- focus on output vs outcome
- candidate core concepts
    - life-cycle
    - Change
    - consideration of time-scales
- Useful concepts and principles
    - inclusive approach wrt eg conceptual vs. real systems
    - phaneron or mosaic
    - affordance
    - discoverability
        - future possibilities
        - unintended affordances
    - potential (possible) vs actual
    - exploration
    - evolvability
    - emergence
        - of affordances
    - feng-shui
        - de-cluttering
    - relevance
    - control ad feedback
    - setting the right boundary
        - sub-systems may not share boundaries with super-systems
    - continual learning
    - narrative
    - Cynefin
    - holism
    - purpose
        - systems may or may not have purpose
        - systems praxis has purpose
        - systems approach has purpose
        - engineered systems have purpose
        - three purposes
            - of SOI
            - of proxis

- of praxitioners
- alignment of purposes is key to successful SE
- IBM systems thinking tool
  - system dynamics models
- ontology modes
  - Peirce
    - possible
      - what might be
    - actual
      - what has been
    - necessary
      - what would be under certain conditions
      - ideal set of relationships
      - mathematics - world of necessary inferences
- core concepts of praxis [Note: GG slide on flight, etc.]
  - flight, run away
  - submit/sustain
  - freeze
- Lawson Paradigms
  - Common to Sci and Eng [Note: Bud Lawson -Science - "Understanding", Engineering - "Creating Solutions"]
    - situation system [Note: Thematic]
      - Natural
      - Mixed
      - Man-made
    - respondent [Note: transforms one situation into a new situation]
      - Project
      - Program
      - Task
      - Experiment
    - system assets
      - Facilities
      - Instruments
      - Theory
      - Knowledge
      - Methods
      - Tools
      - Processes
  - Fundaments of Change
    - OODA loop [Note: creating understanding]
      - Observe
      - Orient
      - Decide
      - OODA-Act
    - PDCA loop [Note: doing things]
      - Plan
      - Do
      - Check
      - Act
  - Life Cycle Transformations
    - system of capabilities
      - drives Concept formation
    - system of requirements
      - driven by Concept formation
      - drives Development
    - system of functions.objects
      - driven by Development
      - drive Production

- system product
  - driven by Production
  - drives Utilization & Support
- system service
  - driven by Utilization & Support
  - drives Retirement
- system of lessons learned
  - driven by Retirement
- System Coupling Diagram
- Bud's paradigms
  - Concepts
    - Structures
    - Affordances
    - Behaviors
    - Value
  - Science vs Engineering
  - System coupling diagram
  - Fundaments of change
    - OODA
    - PDCA
  - Systems Life-cycle Information Model
    - T-model
  - Changing the mindset of people
- Gerhard.
  - The serenity prayer
  - 5 std things to do with a risk

- Day 3
  - communication gaps [Note: from G. Chroust. Bridging gaps by cooperation engineering. In Proceedings of the 10th International Conference on Information Integration and Web-based Applications & Services, pages 382–389. ACM, 2008.]
    - cultural
    - physical
    - education
    - psychological
    - physiological
    - language
  - timeliness of system science
    - focus on similarities
    - accumulation of experience with complex systems
    - identifying the small number of principles common to SE domains [Note: search for the Pareto 20%]
  - accumulated experience of handling complexity
  - finding the 20% that drive the 80%
    - finding the driving concepts and principles
  - getting tribes to work together in a fruitful way
  - systems engineering(-related) science [Note: that part of systems science relevant to SE]
    - leaving the dogma-side out
    - variants
      - complex systems engineering
      - hybrid systems engineering
      - system of systems engineering
        - SEBoK synthesis ??
          - SOS is an integration of a finite number of constituent systems which are independent and operable which are networked together for a period of time to achieve a higher goal
        - US DOD SE Guide for SOS defn
          - An SoS is defined as a set or arrangement of systems

that results when independent and useful systems are integrated into a larger system that delivers unique capabilities [DoD, 2004(1)]. Both individual systems and SoS conform to the accepted definition of a system in that each consists of parts, relationships, and a whole that is greater than the sum of the parts; however, although an SoS is a system, not all systems are SoS.

- SoSECE defn
  - System of Systems (SoS) Engineering is an emerging interdisciplinary approach focusing on the effort required to transform capabilities into SoS solutions and shape the requirements for systems. SoS Engineering ensures that
    - Individually developed, managed, and operated systems function as autonomous constituents of one or more SoS and provide appropriate functional capabilities to each of those SoS
    - Political, financial, legal, technical, social, operational, and organizational factors, including the stakeholders' perspectives and relationships, are considered in SoS development, management, and operations
    - A SoS can accommodate changes to its conceptual, functional, physical, and temporal boundaries without negative impacts on its management and operations
    - A SoS collective behavior, and its dynamic interactions with its environment to adapt and respond, enables the SoS to meet or exceed the required capability.
- What is scope of SE or Systems Praxis
- Key problem now is the integration of engineered systems with human society, the natural environment, and sustainability issues
- using patterns from natural and man-made systems to inform and improve the way we design new systems

- social value architecting
  - Taguchi: maximize value to society
- Applied System Science Systems Applied Science Systems Engineering Science Pragmatic Systems Science Systems Science Praxis ✓ Science for Systems Praxis / Actualization
  - science … engineering … basic … applied … praxis … pragmatics … art … aesthetics
  - for the sake of a solution
  - craftsmanship v art
  - creating successful systems
  - decision-making process
  - praxis: bringing systems into being; realizing an intervention
  - model actions as arising from force or valuation
    - sheep will have their wool taken v sheep will be relieved of their wool
- praxis
  - translating an idea into action [Wordnet]
  - sister terms from Wordnet
- systems praxis
  - SE1 abstract stage
  - SE2 concrete (implementation) stage
  - Does SP cover both or just SE1?
  - translating ideas into action
- taking a pragmatic approach to defining the Science of Systems Praxis
  - draw the boundary where it is useful for a particular analysis

    - Churchman: the "environmental fallacy" and the need to continually re-consider what is excluded (a class of environments)
    - one of the key principles: choosing the boundary
    - continual learning
- key concepts and principles for SSP vs SE
    - value cycle and life cycle
    - tradespace
        - key is picking the right metrics
        - start from effectiveness criteria, not requirements
        - efficiency, effectiveness, equities (evolvability, elegance)
- development of shared vision and mental models related to usage of paradigms
    - cf., belief systems
    - ontology, epistemology, language
    - all related to models used in human problem solving
    - plurality of perspectives
    - selection of paradigms or metamethodologies
    - place of narrative
        - cf., beliefs, paradigms and culture
        - gives shared experience
        - heroes, legends, etc.
        - How are paradigms that relate concepts and principles expressed as models (and as narratives)
    - shared meaning making in human experience
    - toward a shared vision of the Science of Systems Praxis
    - Science progresses one funeral at a time
    - Kuhn: paradigms are incommensurable
        - competing paradigms are in fact constantly being measured against each other.
        - Thinking inside the box is analogous with normal science.
    - Cynefin framework
        - both through the direct influence of personal experience, and through collective experience, such as stories or music.
    - accidental complexity; special cause; essential complexity; common cause
        - and system boundary
        - control vs influence
- how do you define the system of interest
    - Ross Ashby SOI
    - Holistic Image of Parts, Interactions, Contexts, Relationships, Destiny
- Weltanschauung
    - Positivism
    - Constructivism
- system, context, environment
- SOWA's Diamond
- Jack
- Practice can be counterposed to procedure
- Hillary
    - Triad picture
        - What about ART?
    - Table 1 Function
        - Hitchins' def problematic wrt inanimate (non-living, physical) systems (eg solar system)
- Purpose is central in systems approach
- manage ==> makes decisions (for which modeling only in terms of forces is inadequate)
- Isolate the few driving principles; it is the accumulation of experience with systems and complexity
    - Find the 20% of the principles/concepts that account for 80%
    - the SoSM are Varieties of human problem solving
- Systems Engineering Science: that part of systems science relevant to systems

engineering
- A.What is the scope of Systems Engineering or Systems Praxis
- B.The key problem now is the integration of engineered systems with human society, the natural environment, and sustainability issues
- DIKW:
    - holistic information events require completion
        - information anxiety -- if not completed
- SEBoK
    - A.not a tutorial
    - B.not a grab bag
    - C.a coherent multi-methodological guide to the systems landscape
        - a.take a position (view from somewhere)
        - b.lay basic groundwork
        - c.minimize damage
- KEY: can reduce errors and unintended consequences but you cannot eliminate them
- KEY: Make your assumptions explicit so you can test them
- KEY: Need to remain vigilant and iterate (ongoing learning)
- KEY: Human are doing the praxis and humans are in the target system
    - A.common vision of purpose for successful system would guide the practice
- Emphasize product, emphasize process, emphasize practice
- KEY: we need a position on purpose
- KEY: essential systems affordances
    - A.the affordances are objectively constrained
- Patterns as core concept
- Takaku-san on affordance:
    - A.potential is always changing
    - B.the present and the future
    - C.estimate of future probability
    - D.performance KIP are m t q h s that determine
        - BS, DIN, Eurocode, AASHTO code
- Reduction of the cognitive load with the right core concepts
- A system is an entity which maintains its existence through the mutual interaction of its parts [in the context of its environment].
- GOAL for this week: core concepts, principles, patterns, and paradigms that can be shared between SS, ST, and SE in an integrated systems approach
    - core = minimal set; 80/20 rule; RISC; starter set?
    - Comap and Cmap tools
    - embed graphics in Comap, Cmap

- Day 4
    - GOAL for this week: core concepts, principles, patterns, and paradigms that can be shared between SS, ST, and SE in the integrated systems approach
        - core = minimal set; 80/20 rule; RISC; starter set?
        - Comap and Cmap tools
        - embed graphics in Comap, Cmap
        - Human and machine targets?
            - human-to-human
                - natural language
                - constrained natural language
            - human-to-machine
            - machine-to-human
            - machine-to-machine
    - RD: We want practitioners to be able to use core concepts, principles, patterns, and paradigms in an integrated systems approach in order to work with actors within a worldview scope to achieve a successful and sustainable transformation of a problem situation into an improved situation through an intervention (a.k.a. create and deploy a respondent system).
    - CATWOE of Week's Goal [Note: Evaluation factors to assess opportunities]
        - Stakeholders (hold for future use)

- Clients/Customers [Note: Stakeholders]
  - Helpful Questions
    - Who are the beneficiaries of the highest level business process and how does the issue affect them?
    - Who is on the receiving end?
    - What problem do they have now?
    - How will they react to what you are proposing?
    - Who are the winners and losers?
      - winners:
        - practitioners
        - systems integrators
        - consultants
      - losers:
        - consultants
        - project heroes who benefit from lack of common language
        - all commercial orgs who make money out of lack of transparency (e.g., system integrators, bliveteers)
        - middle managers
  - systems practitioners
- Actors [Note: Users]
  - Helpful Questions
    - Who is involved in the situation, who will be involved in implementing solutions and what will impact their success?
    - Who are the actors who will 'do the doing', carrying out your solution?
    - What is the impact on them?
    - How might they react?
- Owner
  - Helpful Questions:
    - Who owns the process or situation being investigated and what role will they play in the solution?
    - Who is the real owner or owners of the process or situation you are changing?
    - Can they help you or stop you?
    - What would cause them to get in your way?
    - What would lead them to help you?
  - The systems community
    - practitioners
    - researchers
    - educators
  - Currently Group 4
- Transformation Process [Note: From initial state to end state]
  - Helpful Questions
    - What processes or systems are affected by the issue?
    - What is the process for transforming inputs into outputs?
    - What are the inputs? Where do they come from?
    - What are the outputs? Where do they go to?
    - What are all the steps in between?
  - We want practitioners to be able to use core concepts, principles, patterns, and paradigms in an integrated systems approach in order to work with actors within a worldview scope to achieve a successful and sustainable transformation of a problem situation into an improved situation through an intervention (a.k.a. create and deploy a respondent system).
    - Intervening (as an action or via creation and deployment of a

successful, respondent system) to resolve a problem situation
- Worldview
  - Helpful Questions
    - What is the big picture and what are the wider impacts of the issue?
    - What is the bigger picture into which the situation fits?
    - What is the real problem you are working on?
    - What is the wider impact of any solution
  - We want the core concepts, principles, patterns, and paradigms in an integrated systems approach (CL4SP) to be useful to practitioners and other stakeholders concerned with problem situations calling for solutions involving hybrid systems including Social, Technical, Economic, Environmental, Political, Legal, Ethical, Demographic aspects, i.e., STEEPLED.
  - Globalization
    - barrier-free
      - border
      - culture (common language)
      - money (common currency)
- Environmental Constraints
  - Helpful Questions
    - What are the constraints and limitations that will impact the solution and its success?
    - What are the broader constraints that act on the situation and your ideas?
    - What are the ethical limits, the laws, financial constraints, limited resources, regulations, and so on?
    - How might these constrain your solution? How can you get around them?
  - Humans and machines, different languages, "symbol systems", and standards; mental models, culture, experience, people with different roles, seniority and status (power relationships), learning styles, NLP (neuro-linguistic-programming) modalities, gender, multidisciplinary, management pressure, multi-site, multi-organization, multi-national, legal, infrastructure, institution, education (scope, discipline, level), belief systems and paradigmatic silos, spread-think and group-think, narratives and success stories, inertia, not-invented-here
  - Natural environment (hazards, pollutants, resources)
  - Social environment (social requirement, public acceptance, increase in population)
  - Engineering and design constraints: laws, specifications, codes, new built & maintenance (lifetime)

- Elements of praxis language
  - concepts
  - patterns
  - principles
  - paradigms
- Laws should be "accepted theory"
- KEY IDEA: need a continuum between simple and complex
- Kast & Rosenzweig: Key Concepts of General Systems Theory
  - Subsystems or Components
  - Holism, Synergism, Organicism, and Gestalt
  - Open Systems View
  - Input-Transformation-Output
  - System Boundaries
  - Negative Entropy
  - Steady State, Dynamic Equilibrium,and Homeostasis
  - Feedback

- Hierarchy
- Internal Elaboration
- Multiple Goal-Seeking
- Equifinality of Open Systems
- Len Troncale: Towards a Science of Systems

- Day 5
  - System Praxis
    - Definitions:
      - Translating an idea into action by thinking in terms of systems [Note: IFSR 2012]
        - Thinking and acting in terms of systems [Note: H. Lawson]
      - Systems praxis is the act of engaging, applying, exercising, realizing, or practicing ideas about systems
        - Praxis is the process by which a theory, lesson, or skill is enacted, practiced, embodied, or realized. "Praxis" may also refer to the act of engaging, applying, exercising, realizing, or practicing ideas. [Note: Wikipedia]
      - System praxis also includes the appreciation of systems by recognizing the quality, value, significance, or magnitude (of, e.g., people and things) as they contribute to system behavior that lead to desirable outcomes.
    - the doing
      - different roles do different aspects of ISA and some that do all three
      - difference between appreciating and executing
      - praxis of systems engineering draws upon results of systems science praxis
      - the product is a result of praxis that includes all three aspects utilized with appropriate emphasis
      - assimilating into Communities of Practice (CoP)
      - integrating into patterns
        - system patterns
        - system praxis patterns
  - principles
    - best done when you draw on all three SS, ST, SE
    - knowing when to stop is a key principle of system praxis
    - the practice of science and the practice of engineering are fallible human activities
    - take the federated belief system view
    - reality always has all three aspects and therefore projects as well
    - the importance of decoupling
  - Action Plan
    - Out briefing
      - Three Cultures (Cross)
      - System Value Cycle (Ring)
      - Integ Sys Approach (Sillitto)
      - Dualities (Sillitto)
        - (not discussed)
          - order/chaos
          - commodity/capital
          - solitude/interactive
          - stability/change
          - process/structure
          - fixed/dynamic
          - efficiency/innovation
          - structure as medium/structure as outcome
          - internal/external
      - CATWOE Summary & Praxis Definition (Lawson)
      - Summary Chart (SS & SS -> SE & SI)
    - Reports
      - Journal papers [JS]

- Sys Res & Beh Sys (SRBS) Journal
- other Journals (SE, etc)

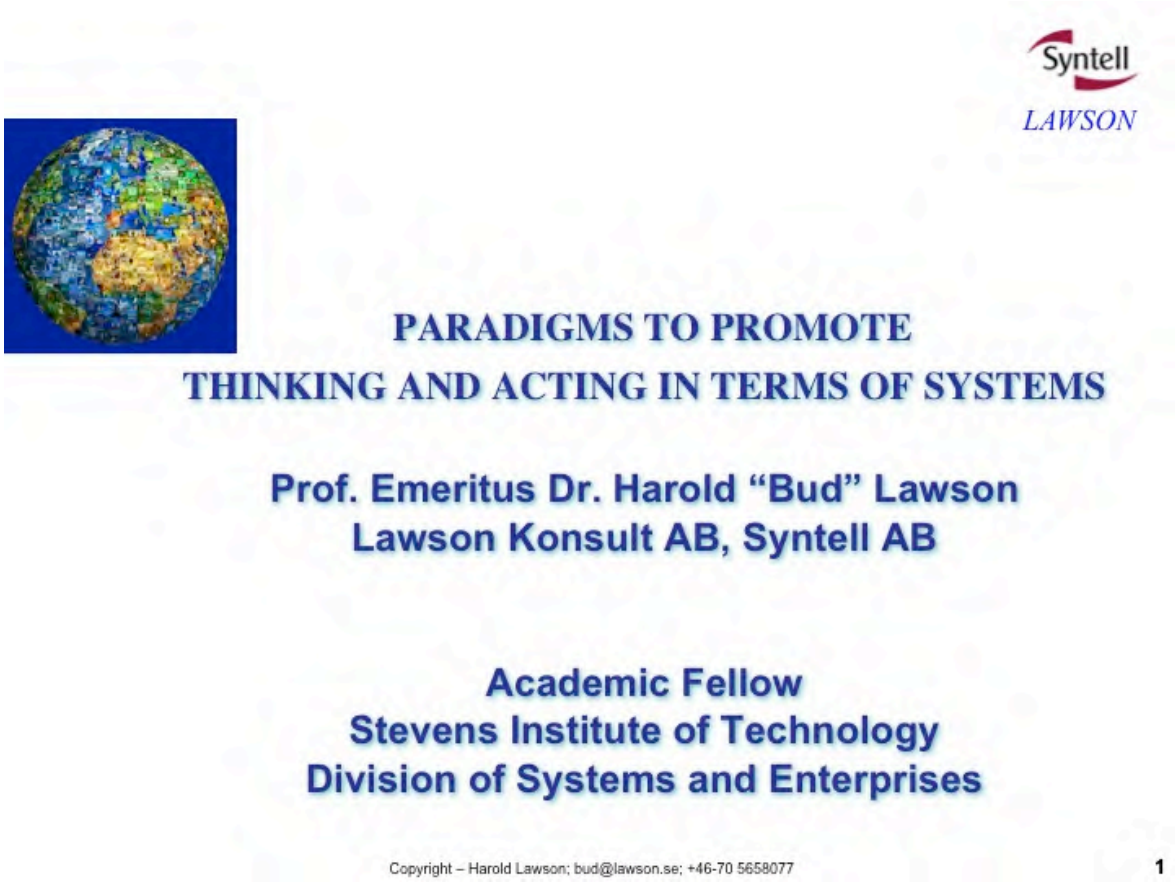
- Conversation Reports [JM]
  - Short report (1/2 page)
  - Full report (10-20 pages)
  - Minority reports (if needed)
- Meetings
  - ISSS [JS]
    - ISSS 12, San Jose
      - ISM session (Ring)
      - paper?
      - workshop?
    - ISSS 13, Viet Nam
      - TBD
      - planning for this at ISSS 12 mtg
  - INCOSE
    - IS12 [HS]
      - add session to SSWG workshop
      - Joint Leaders Mtg report
        - CAB
        - Tech Ops
      - Fellows Mtg report & discussion
      - Location: Rome, Italy, July 2012
    - IW13 [JM]
      - SSWG workshop
      - Tech Ops report
      - Fellows Mtg report & discussion
      - Location: TBD arizona or florida, Jan 2013
    - IS13 [tbd]
      - Location: Philadelphia, July 2013
      - SS workshop?

- Deliverables
  - Collection of useful materials from Conversation [JM]
    - Key Diagrams in ppt
    - Concepts List
    - Principles List
    - Patterns List
  - Chart photos in ppt [GC]
  - Meeting notes in comap form [MS]
    - comap raw format
    - PDF & RTF forms
    - HTML form?
    - issue with license, free or limited or paid?
  - Executive Summary [HS]
    - Z-guide format
    - 1 sheet, two sides
- Miscellaneous
  - Excerpts from Mesarovic book [JS]
  - Cmap models [RM]
    - J Ring cmap updates
    - new cmaps
  - Additional CATWOE's [HS]
    - Sys Science
    - Sys Thinking
    - Sys Engineering
- Future teamwork
  - Continue Team 4 as IFSR-sponsored workgroup [GC]
  - future telecon mtgs [JM]

- way forward
    - team learning
        - how do we instrument the foundations for team learning across the three "roles" SS, ST and SE
    - in the future, people become disciplined in all four focus areas
        - SS
        - SE
        - ST
        - SI
    - learn concepts, principles, paradigms, methods and ways of appreciating

Paradigms to Promote Thinking and Acting in Terms of Systems

Harold “Bud” Lawson



T.S. Kuhn, 1962 – *The Structure of Scientific Revolutions*

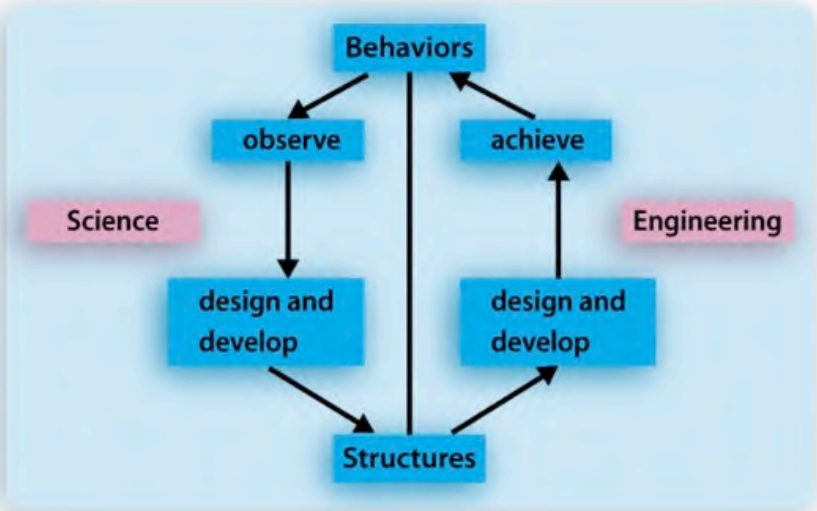
Syntell LAWSON

"a scientific revolution is defined by the appearance of new conceptual schemes or "paradigms." These bring to the fore aspects which previously were not seen or perceived, or even suppressed in "normal" science, i.e., science generally accepted and practiced at the time."

 2

Science and Engineering Relationship to Structures and Behaviors

Syntell LAWSON



 3

System Survival Kit

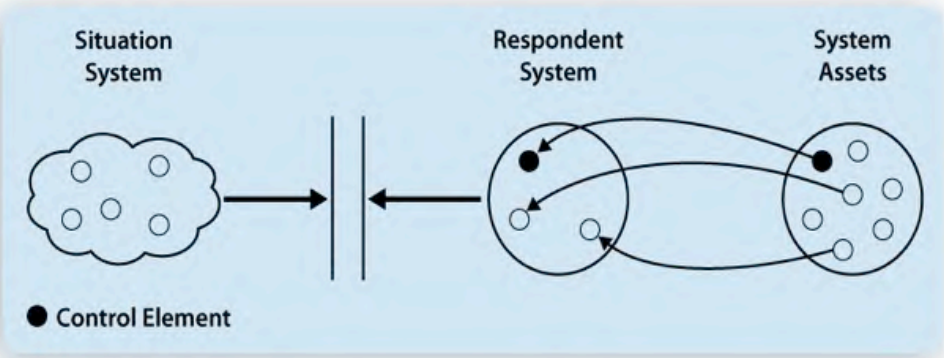
Syntell LAWSON

- **System of System Concepts**
  - **Fundamental**
    - Togetherness, Structure, Behavior, Emergence
  - **Types**
    - Natural, Defined Physical, Defined Abstract, Human Activity
  - **Topology**
    - Hierarchy, Network
  - **Focus**
    - Narrow System of Interest, Wider System of Interest, Environment, Wider Environment
  - **Complexity**
    - Organized Simplicity, Organized, Disorganized, People Related
  - **Role - System Coupling Diagram – Mental Model**
    - Situation, Respondent, System Assets
- **Principles – Stating truths about the Concepts**

 4

System Coupling Diagram

Syntell LAWSON



 5

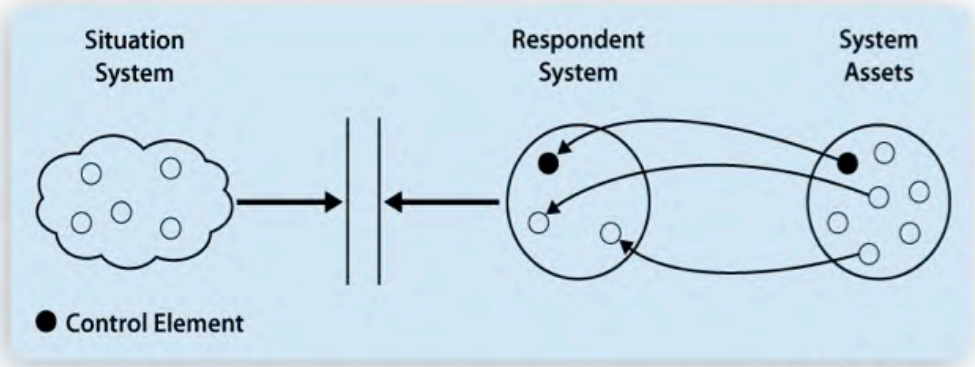
Common for Science and Engineering

Syntell LAWSON

Natural
Man-Made
Mixed
(Thematic)

Project
Program
Task
Experiment

Facilities
Instruments
Theory
Knowledge



Science – "Understanding"
Engineering – "Creating Solutions"

Methods
Tools
Processes

 6

Systems Thinking Paradigms (Quantitative and Qualitative)

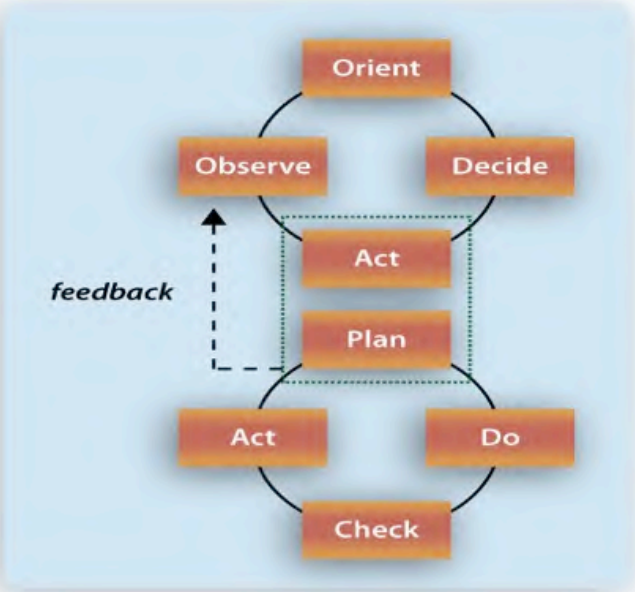
Syntell LAWSON

- Peter Senge
  - Five Why's, Problem Is, Links-Loops-Delay and Archetypes
- Influence Diagrams
- Peter Checkland
  - Soft Systems Methodology
- Boardman and Sauser
  - Systemigrams
- iThink and Stella
- Mathematical Systems Modelling

 7

Fundaments of Change

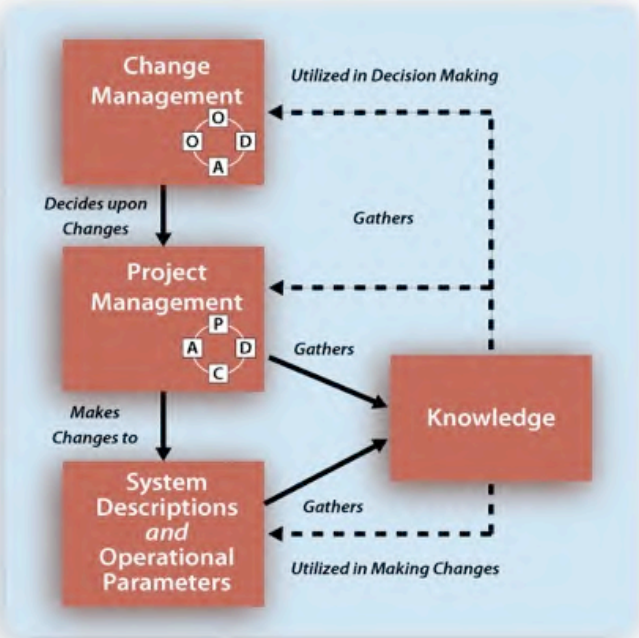
Syntell LAWSON



8

Change Management Model

Syntell LAWSON



9

Engineering Systems

Syntell
LAWSON

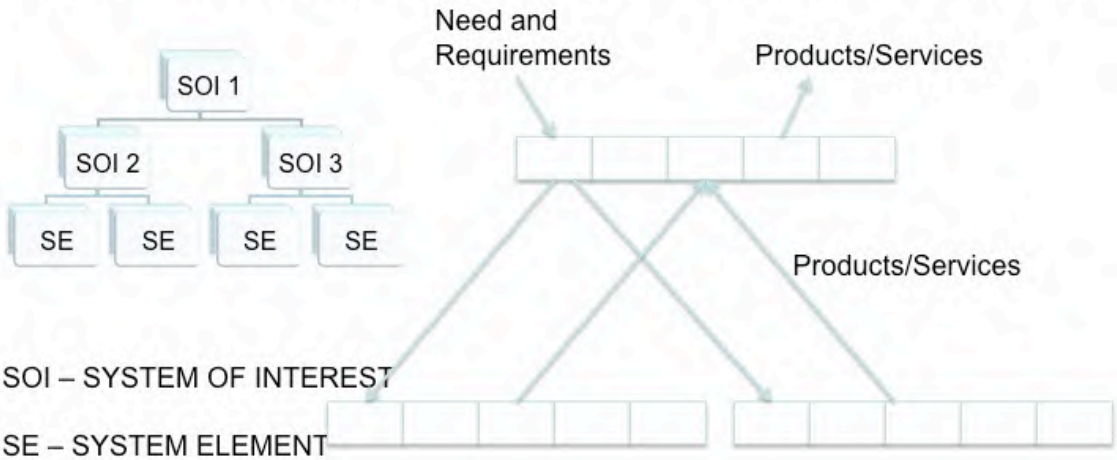
System Breakdown Structure

SOI 1

SOI 2 SOI 3

SE SE SE SE

SOI – Life Cycles / Processes



SOI – SYSTEM OF INTEREST

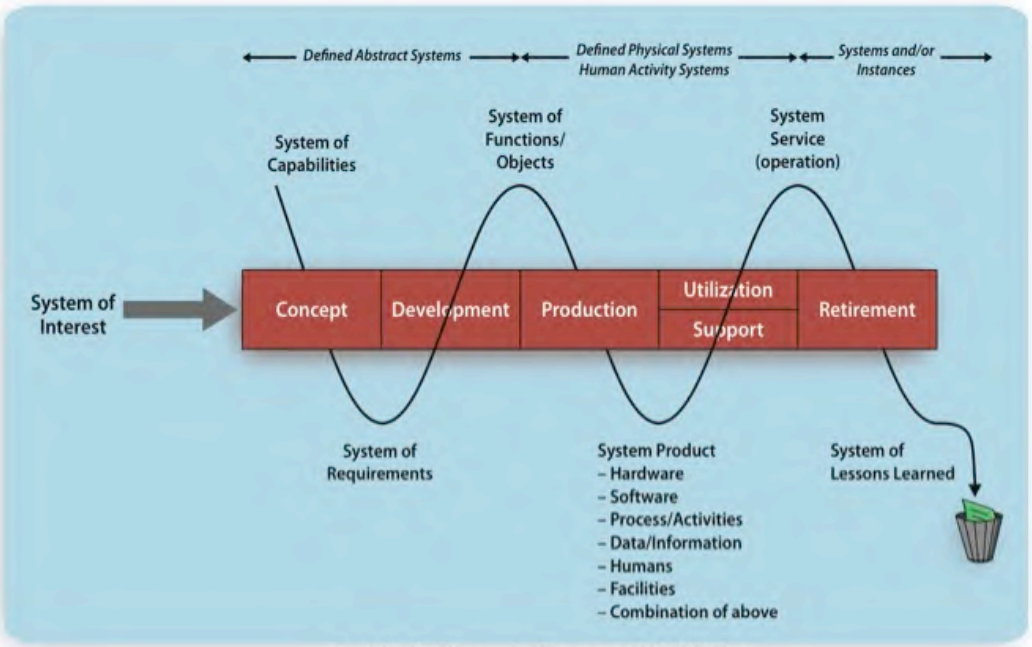
SE – SYSTEM ELEMENT

SOI 2 and 3 – SE's to SOI 1

 10

Life Cycle Transformations

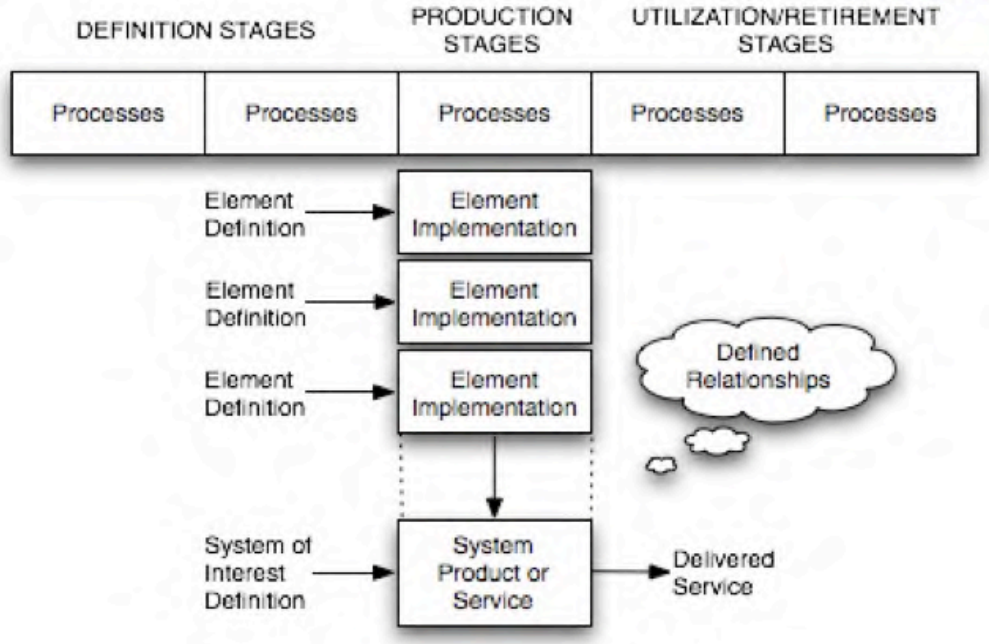
Syntell
LAWSON



 11

(T) Model of System Life Cycles

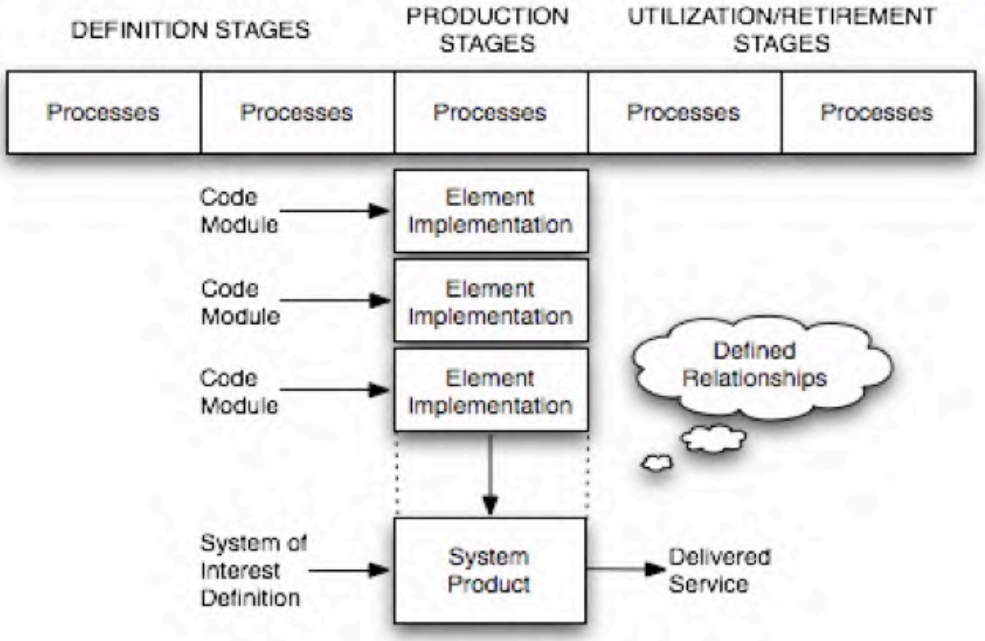
Syntell
LAWSON



 12

(T) Model of Software Life Cycles

Syntell
LAWSON



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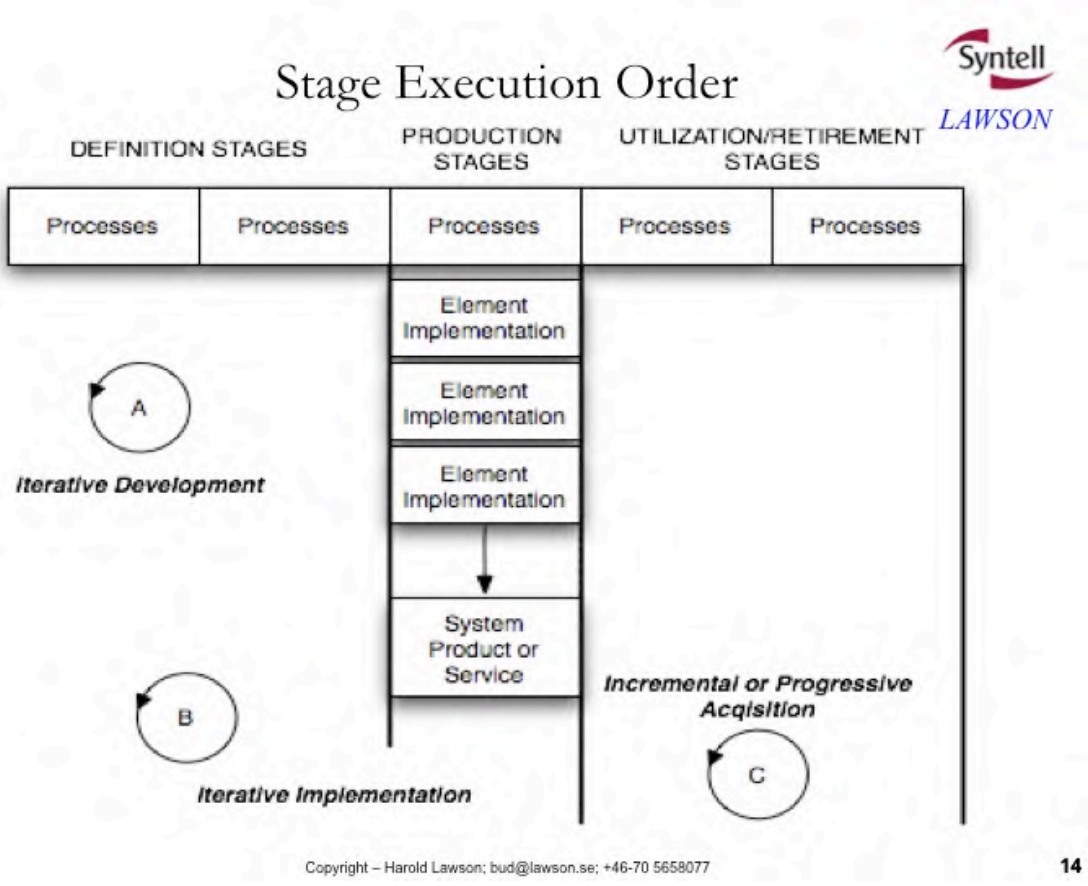
Stage Execution Order
Syntell
LAWSON
DEFINITION STAGES
PRODUCTION STAGES
UTILIZATION/RETIREMENT STAGES
Processes
Processes
Processes
Processes
Processes
Element Implementation
Element Implementation
Element Implementation
System Product or Service
A
Iterative Development
B
Iterative Implementation
Incremental or Progressive Acqisition
C
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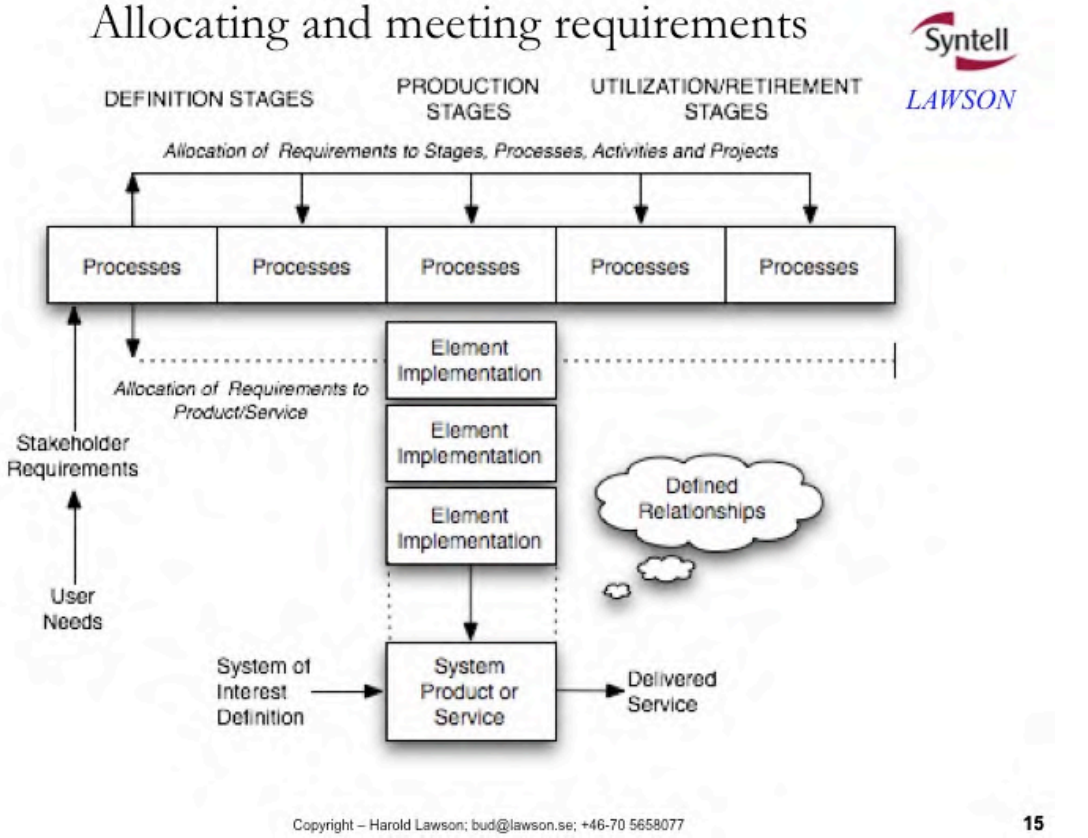
14


Allocating and meeting requirements
Syntell
LAWSON
DEFINITION STAGES
PRODUCTION STAGES
UTILIZATION/RETIREMENT STAGES
Allocation of Requirements to Stages, Processes, Activities and Projects
Processes
Processes
Processes
Processes
Processes
Element Implementation
Element Implementation
Element Implementation
Allocation of Requirements to Product/Service
Stakeholder Requirements
User Needs
Defined Relationships
System of Interest Definition
System Product or Service
Delivered Service
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15

An Illustrative Life Cycle Information Model

Syntell
LAWSON

16

Integrating Systems Thinking, Systems Science and Systems Engineering

Hillary Sillitto

Integrating systems thinking, systems science and systems engineering – understanding the difference and exploiting the synergies

Hillary Sillitto, CEng, FInstP, ESEP, INCOSE Fellow
UK Systems Engineering Director

THALES

The babel problem

Many views on

- Systems science, Systems thinking, Systems engineering
- Hard and Soft systems, etc etc etc

Relationship between them uncertain

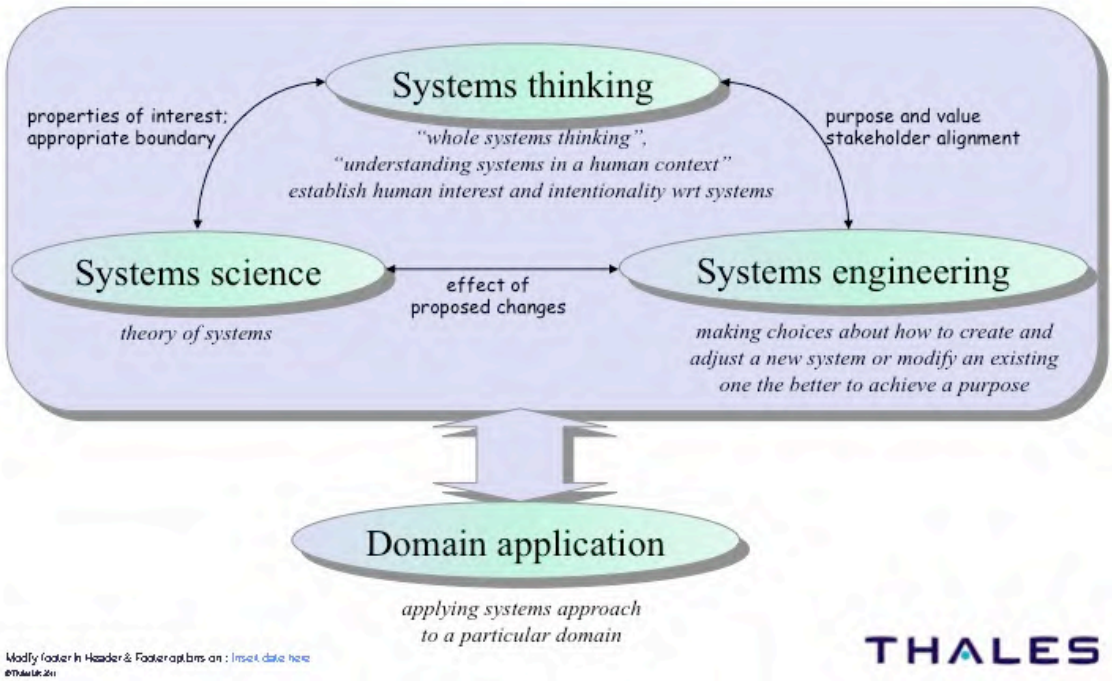
- or at least not widely agreed

My Purpose

- Present a proposal for relationship between SS, ST, SE that is both practical and rigorous
- Point out some of the simplifications and clarifications that follow

THALES

The proposition



THALES

Definitions of "science"

Science:

- a systematic enterprise that builds and organizes knowledge in the form of testable explanations and predictions about the universe.
- An older and closely related meaning: "science" refers to the body of reliable knowledge itself, of the type that can be logically and rationally explained".

Working scientists usually take for granted a set of basic assumptions that are needed to justify the scientific method:

- (1) that there is an objective reality shared by all rational observers; ("positivist")
- (2) that this objective reality is governed by natural laws;
- (3) that these laws can be discovered by means of systematic observation and experimentation."

Modern science is based on the Scientific Method, which can be summarised as:

- observe the real world,
- form a theory as to why things as they are (or as they appear to be),
- form a hypothesis that allows us to test the theory by experiment,
- depending on the result, reject, adapt or provisionally accept the theory.

When there is sufficient evidence to support a theory it can be used to make predictions.

Quotes from a famous scientist

"There is nothing new to be discovered in physics now; all that remains is more and more precise measurement;"

and - "X-rays will prove to be a hoax."

So remember - scientific theories are always "provisional",
because new experiments may reveal limits to accepted theories.

But he also said:

"In physical science the first essential step in the direction of learning any subject is to find principles of numerical reckoning and practicable methods for measuring some quality connected with it.

- ***I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it;***
- ***but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind;***
- ***it may be the beginning of knowledge, but you have scarcely in your thoughts advanced to the state of* Science, *whatever the matter may be."***

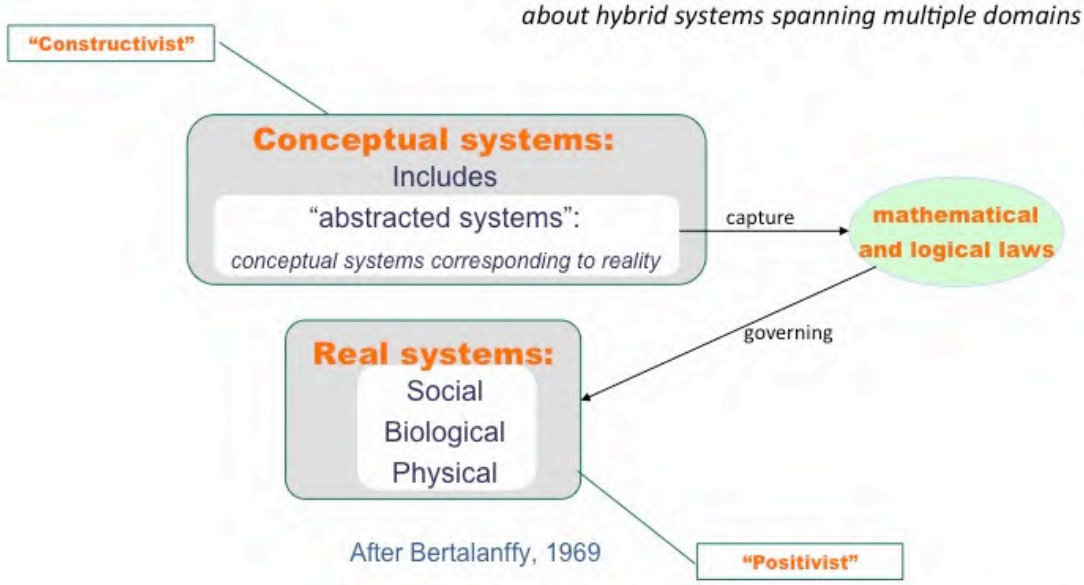
Lord Kelvin, late 19th century

Purpose of systems science in the systems approach:

"to provide useful and relevant theories about systems to inform systems practice".

4 types of systems - and of systems science

Generic "system laws" are required to unify thinking about hybrid systems spanning multiple domains



2 interesting questions about systems

What is different about different kinds of system?

This question leads to "reductionist" enquiry

Leads to wide diversity of concepts, taxonomies, dimensions of variation; with correspondingly wide diversity of practice, experience and opinions

Intriguing: but may not be useful!

What is similar about different kinds of system?

This question encourages us to see similarities not differences

Very useful: allows re-use of patterns, insights and models: in different domains; to integrate across domains.

The subject of systems science – which underpins SE and ST

Overloaded and inconsistent terminology, mismatched mental models, and human desire to be different, all impede recognition and exploitation of common patterns

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General systems theories and models

Many people have discussed general systems theories and models:

- Hitchins
- Dori
- Blockley
- Hubka & Eder (Theory of technical systems)
- And many others - -

Most seem to relate to ideas from 3 primary sources

- Bertalanffy, "general systems theory", e.g. 1969
- Hall, A.D. 1962
- Ashby (ca 1950)

- Bertalanffy emphasises "isomorphy of laws in different fields"

THALES

Common or generic reference model of "system"

A system exists within a wider "context" or environment.

- The environment includes "operational", "threat" and "resource" environments

A system is made up of parts that interact with each other and the wider environment.

A system has system-level properties ("emergent properties") that are properties of the whole system not attributable to individual parts.

A system has

- Structure
- Function
- Behaviour
- A lifecycle
- performance

A system both changes, and adapts to, its environment when it is deployed.

Systems contain multiple feedback loops with variable time-constants so that cause and effect relationships may not be immediately obvious or easy to determine.

Supplementaries

A system may exist independent of human intentionality

A system may be part of one or several wider "containing systems".

A system may be self sustaining, self organising, dynamically evolving

A system may offer "affordances" – features that provide the potential for interaction by "affording the ability to do something"

- Affordances will lead to interactions whether planned or not, e.g. the affordance of a runway to let planes land and take off also leads to a possibly unintended affordance to drive vehicles across it

A system may be

- clearly bounded and distinct from its environment (the solar system, Earth, planes, trains, automobiles, ships, people)
- closely coupled with or embedded in its environment (a bridge, a town, a runway, the human cardiovascular system, internet)
- of fluid and dynamic make-up (club, team, social group, ecosystem, flock of geese, internet)

A system may be technical (requiring one or multiple disciplines to design), social, ecological, environmental, or a compound of any or all of these.

Don't all systems have purpose?

Opposing worldviews:

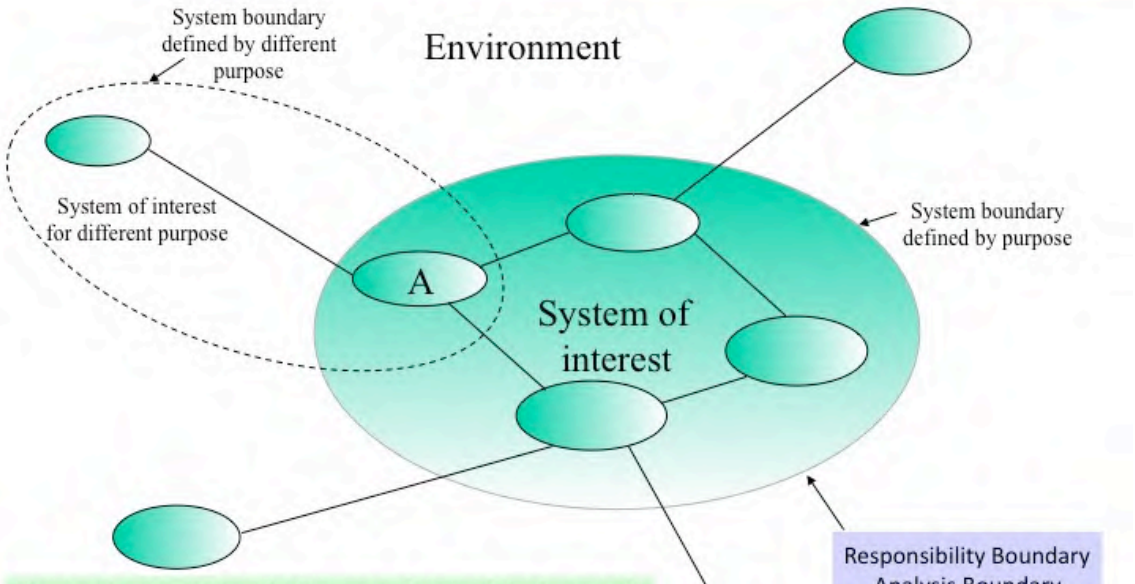
- "systems must have purpose, by definition"
- "real systems" occur in nature with no (or no human) purpose.
- Arguments between these two worldviews become (in my view) unhelpfully metaphysical.
- Also trip up on undisclosed differences in philosophy e.g. Positivist vs Constructivist

I think:

- Engineered systems are engineered for a purpose.
- Some human-made systems are "accidental systems"
  - have unforeseen interactions that lead to unintended consequences.
  - created by humans by accident when deploying or modifying a system for another purpose.
- Natural systems exist, persist and evolve because they provide some stability or viability benefit to the constituent parts of the system.
  - Good examples of this include the many symbiotic relationships in biological systems.
  - Such systems are better understood in terms of "mutual benefit" rather than "purpose".

THALES

Boundary paradox



"Once we have established the "property of interest", the "system of interest" and corresponding system boundary can be determined by finding the set of parts and relationships that are necessary and sufficient to account for the property or properties of interest."

THALES

Systems thinking

Key role of Systems Thinking:

- "establish the purpose and value of the system of interest"

Key outputs of systems Thinking:

- correct choice of problem
- correct identification of stakeholders and their concerns
- correct choice of system properties of interest
- correct choice of system boundary, or criteria for making that choice
- alignment of stakeholder purpose, values and incentives
- identify those parts of problem to "managed" and those to "solve"
- correct programme construct for a complex system development
- define purpose and value for each set of systems engineering activities.

THALES

Systems Engineering

Choices

- The function, behaviour and performance we believe are required to achieve purpose, satisfy stakeholders, and avoid unintended negative consequences
- The structure, behaviour and performance attributes of the system of interest and of its components
  - (may include people, processes, services etc);
- Making, or providing evidence to support, value-driven trade-offs between different approaches and solution options
- Those variables in the external environment of the system that will be explicitly measured by the system;
- How susceptible the system is to environmental variables we have chosen not to explicitly measure
- How to prove system meets stakeholders' needs & expectations, and is fit for purpose

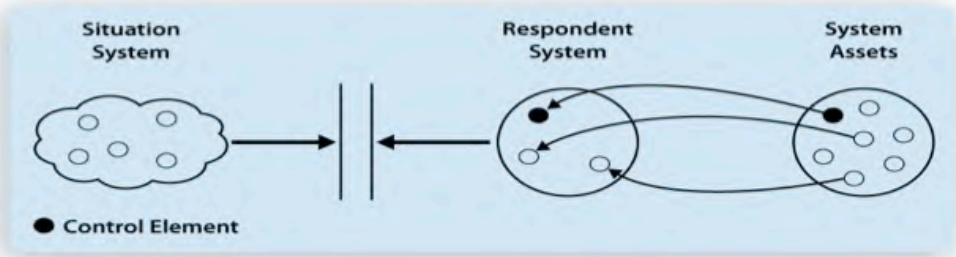
Activities

- Get the system working as a system and delivering the intended benefits
- Define the parts and their interfaces and associated processes and behaviour of
  - The operational system
  - Enabling systems including:
  - The development organisation
  - The test system
  - The manufacturing system and supply chain
  - The setting to work system
  - The support system
  - The decommissioning system
- Document these, and related process, practices and assumptions, so the system can be replicated and managed through life

prove the design will work at as early a stage in the project as possible, to avoid building a flawed design, or solving the wrong problem.

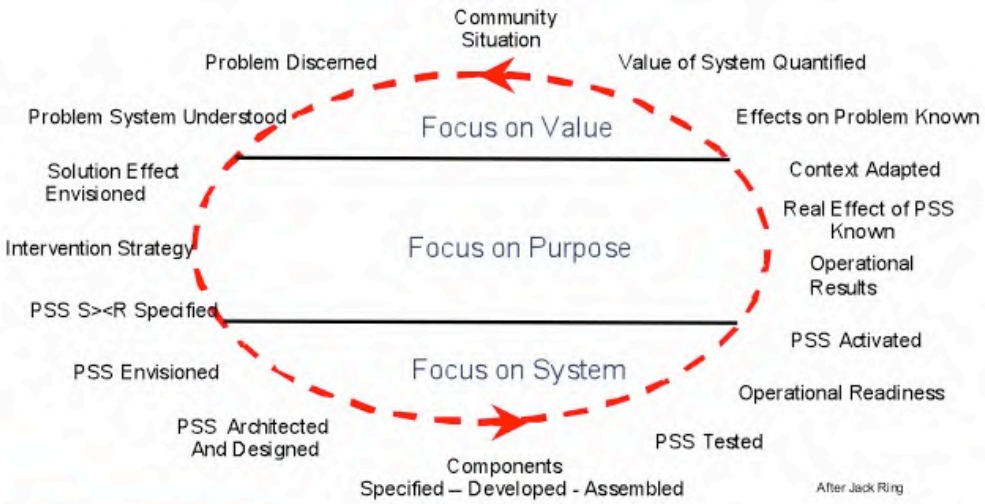
THALES

Systems Approach example 1: System Coupling Diagram



Bud Lawson, 2010

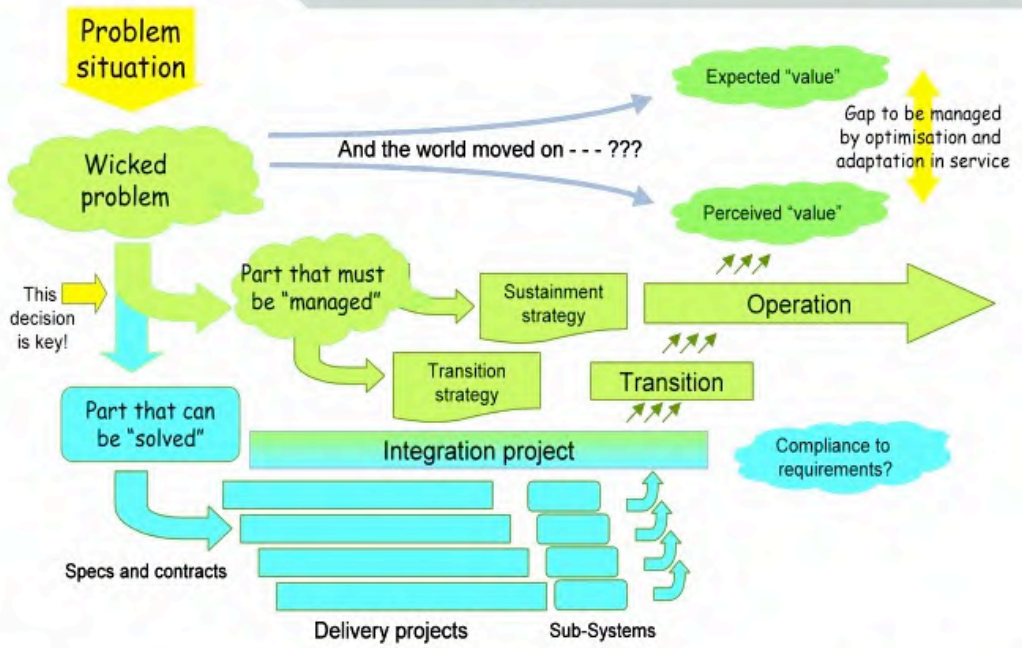
Systems Approach example 2 – system value cycle



PSS = "problem solution system"

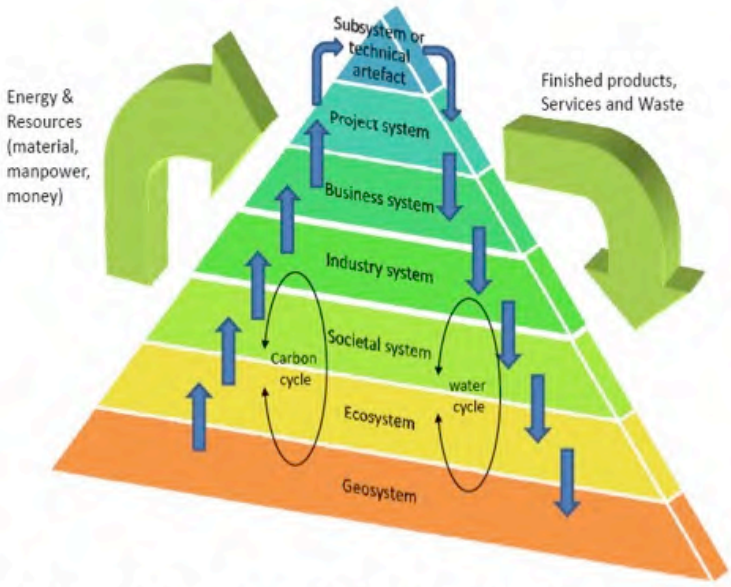
Jack Ring, 1998 & 2004

Example 3: "Soft and hard"

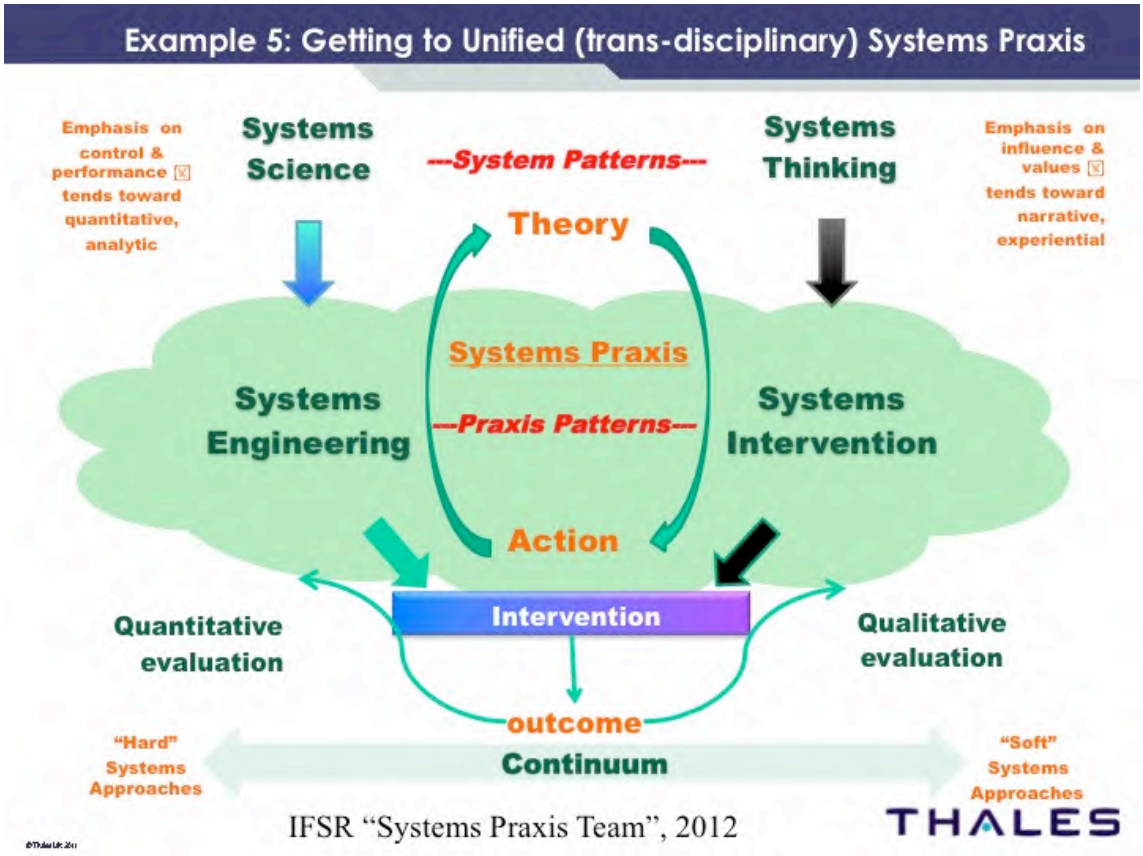


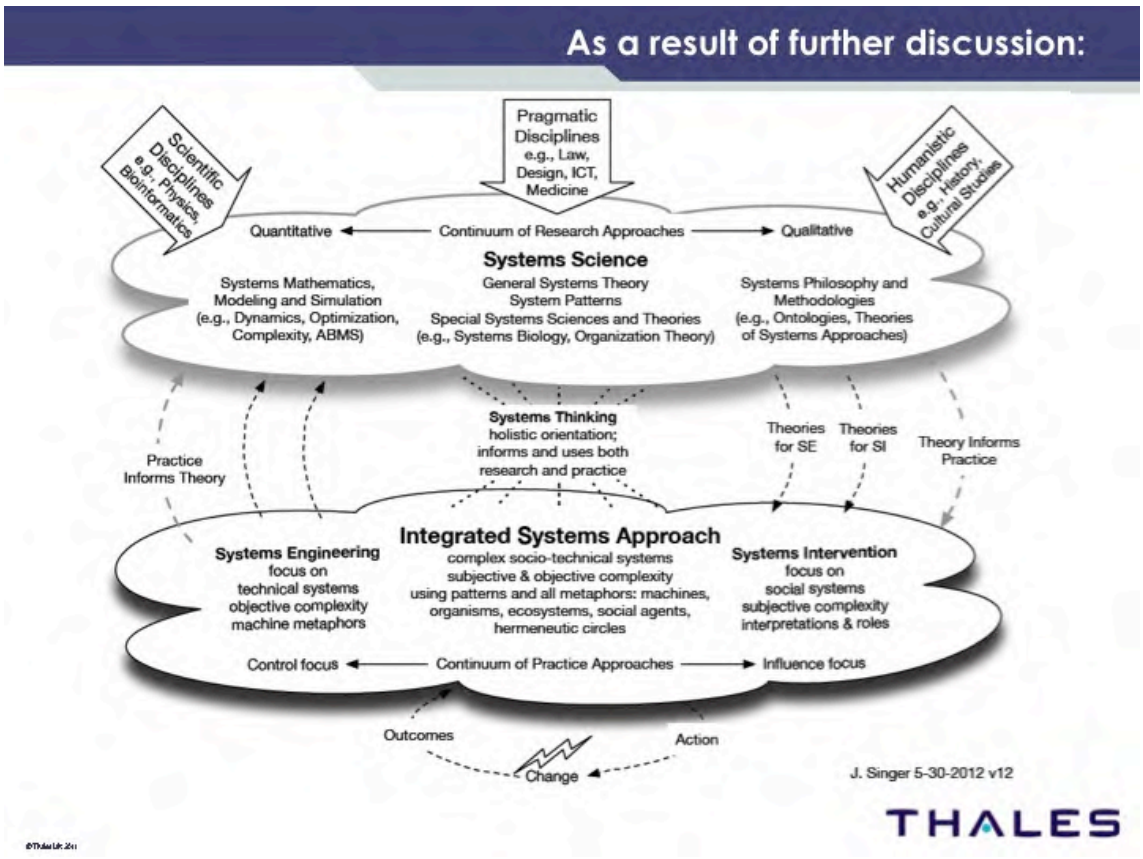
Hillary Sillitto, 2009-10

Example 4: Closed cycles in nested layers of subsystems



Derek Hitchins 1990's, extended by Sillitto & Godfrey, 2009


Example 5: Getting to Unified (trans-disciplinary) Systems Praxis
Emphasis on control & performance tends toward quantitative, analytic
Systems Science
---System Patterns---
Systems Thinking
Emphasis on influence & values tends toward narrative, experiential
Theory
Systems Praxis
Systems Engineering
---Praxis Patterns---
Systems Intervention
Action
Intervention
Quantitative evaluation
Qualitative evaluation
outcome
"Hard" Systems Approaches
Continuum
"Soft" Systems Approaches
IFSR "Systems Praxis Team", 2012
THALES


As a result of further discussion:
Scientific Disciplines e.g., Physics, Bioinformatics
Pragmatic Disciplines e.g., Law, Design, ICT, Medicine
Humanistic Disciplines e.g., History, Cultural Studies
Quantitative
Continuum of Research Approaches
Qualitative
Systems Science
Systems Mathematics, Modeling and Simulation (e.g., Dynamics, Optimization, Complexity, ABMS)
General Systems Theory
System Patterns
Special Systems Sciences and Theories (e.g., Systems Biology, Organization Theory)
Systems Philosophy and Methodologies (e.g., Ontologies, Theories of Systems Approaches)
Practice Informs Theory
Systems Thinking
holistic orientation; informs and uses both research and practice
Theories for SE
Theories for SI
Theory Informs Practice
Integrated Systems Approach
Systems Engineering
focus on technical systems
objective complexity
machine metaphors
complex socio-technical systems
subjective & objective complexity
using patterns and all metaphors: machines, organisms, ecosystems, social agents, hermeneutic circles
Systems Intervention
focus on social systems
subjective complexity
interpretations & roles
Control focus
Continuum of Practice Approaches
Influence focus
Outcomes
Action
Change
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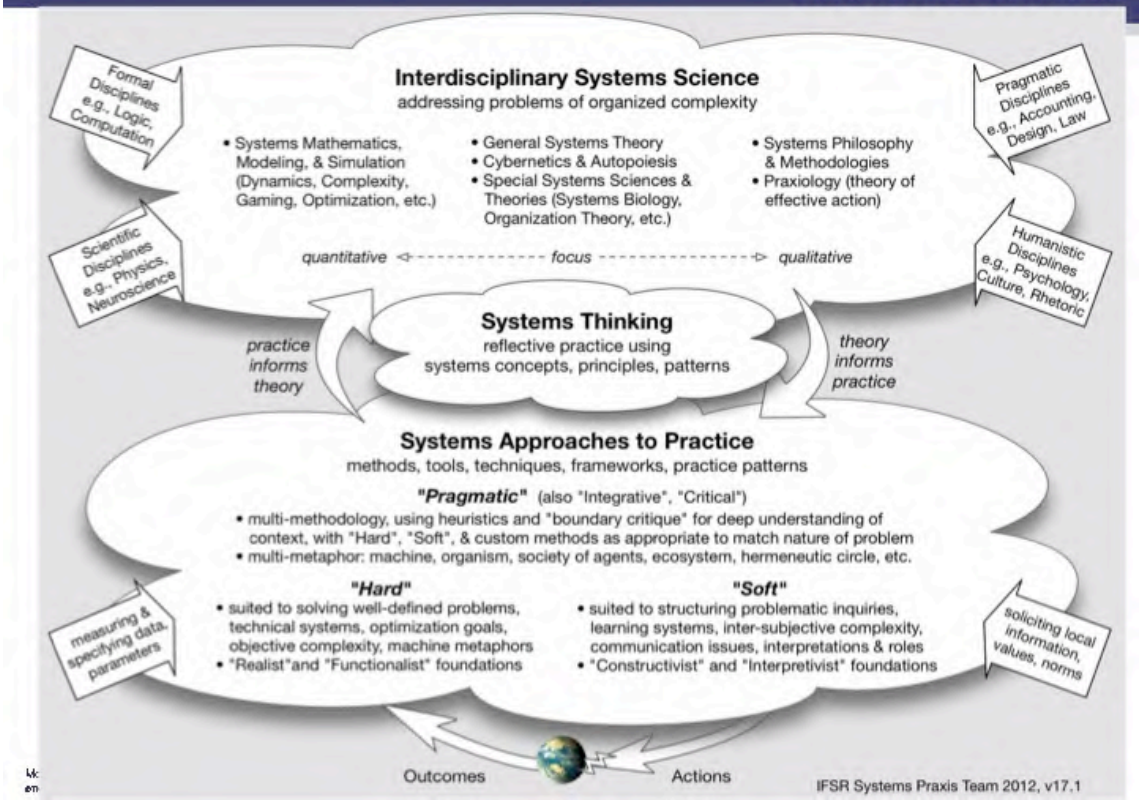
And further refined:



Domain specific systems approach

A systems approach in a particular domain will apply these general principles within the context of existing knowledge about the particular domain.

This may include

- an understanding of domain problems, constraints, risks and opportunities;
- the best order to tackle issues as we approach a problem in the domain.

Domain experts

- understand the degrees of freedom and appropriate design approaches
- know how to do the specific analyses relevant to standard functions and performance.

The advantage of a domain-specific approach:

- better efficiency based on risk-aware replication of known practices and proven design rules.

Potential disadvantages are

- blindness to cross-domain opportunities and issues,
- risk of the "wrong-problem syndrome", solving the problems that interest domain experts rather than what is needed to resolve the problem situation.

Conclusions

Systems engineering depends on

- systems thinking to identify purpose and value and appropriate programme portfolio and stakeholder alignment;
- systems science for a fundamental understanding of the nature and characteristics of systems

So

- systems thinking is used to establish strategies for systems engineering.

If systems science can be correctly codified it allows us to

- develop useful domain independent system concepts, abstractions, principles and models
- that will aid the practice of systems engineering.

Domain specialisation adds specific knowledge of

- key constraints, functions and performance parameters in the domain.

Systems engineers need to understand elements of systems science and systems thinking to be able to operate as effective systems engineers.

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Thank you for your attention. Any questions?

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Experienced Theory and Praxis of Human Activity

Tatsumasa Takaku

Abstract: *UERO aims at building a common community of linking people with 3 major concepts: money, borderless and language, being free and common. In the long history of human activity, culture, tradition, customs, life style, language have been formed gradually based upon politics, economics, and natural and social environments. Herein, experienced theory and praxis of human activity are evaluated from different angles in the field of population at urban districts, wealth and income due to globalization and common languages. Finally, a few business models are proposed based upon the experienced theory. This paper is addressed based upon the 4 keywords; human activity, common community, praxis and system research*

Keywords: experienced theory, praxis, human activity, common language, Zipf's law, Pareto law, population, globalization, wealth and income, urban city, business model

Acknowledgements: This paper is prepared particularly for the Sixteenth IFSR Conversation (2012.4) in Linz, Austria. The title of this paper is somewhat influenced by the Eastern Japan Earthquake Disasters (2011.3.11). I greatly appreciate the opportunity for me to prepare this paper as a contribution to the IFSR Conversation.

1. Principles and experienced theory: Zipf's law and Pareto law

1.1 Zipf's law

Zipf's law is an empirical law formulated using mathematical statics refers to the fact that many types of data studied in the physical and social sciences can be approximated with a Zipfian distribution. A formula of Zipf's law by Zeta distribution is given by;

$$f(m, s, n)=(1/m^s)/\sum(1/n^s) \qquad n=1,2,3,\ ,\ N \tag{1}$$

When s=1,

$$f(m,N)=(1/m)/\sum(1/n)=1/(m*SUM) \tag{2}$$

SUM=$\sum(1/n)$, N is total number of sampling data . f (m,N) is proportional to 1/m

1.2 Pareto Distribution (Figure-1)

Pareto distribution is expressed by probability density function Pr that coincides with social, scientific, geophysical, actuarial and observable phenomena.

When X is greater than some number x, the survival function (tail distribution) is given by

$$Pr(X>x) = (xx/x)^{k} \quad \text{for } x>xx \qquad (3)$$

$$=1 \quad \text{for } x<xx$$

Where xx is the minimum possible value of X(X>0), and k is a positive parameter. The distribution is characterized by a scale parameter xx and a shape parameter k which is known as the tail index. When Eq (3) is used for distribution of wealth, then the parameter k is called the Pareto index. Figure-1 illustrates Pareto distribution Pr for various k values (k=1, 2, 3) with xx=1.

1.3 Relationship of Zipf's law and Pareto law

When xx=1, and k=1, Eq (3) is given as the same equation of Zipf's law,

$$y=1/x, \text{ (x*y=c: Potential energy is reserved in constant c (capacity))} \qquad (4)$$

Pareto distribution is a continuous probability function. Zipf's law, which is sometimes called the zeta distribution, will be considered as a discrete counterpart of the Pareto distribution.

The cumulative distribution function is given by integration of Eq (4).

$$F(x)=\int dx/x=Log(x)=LN(x) \qquad (5)$$

Pareto principle is based upon Eq (5), by EXCEL function LN(x).

1.4 Fields of Application

Pareto originally used this distribution to describe the allocation of wealth and income among individuals. Pareto principle or "80-20 rule" says that 20% of the population controls 80% of the wealth. The remaining 80% of the population shares the rest 20% of the wealth. This distribution is not limited to describing wealth and income, but also to many situations where equilibrium is found in the distribution of size(large to small), weight(heavy to light), money(rich to poor), quantity (many to few) and Quality (good to bad, old to new). The following examples are sometimes seen as approximately Pareto-distributed.

1) The sizes of human settlements (a few cities, many hamlets/villages)
2) Hard disk drive error rates
3) The values of oil reserves in oil fields (a few large fields, many small fields)
4) Numbers of species per genus
5) Sizes of sand particles
6) Sizes of fractured pieces
7) Areas burnt in forest fires
8) Severity of large casualty losses for certain lines of business
9) Annual maximum one-day rainfalls and river floods

1.5 Pareto principle (Table-1)

Pareto principle is stated as "A-B rule", such as "80-20 rules", based upon Eq (5).

When Pareto law is based upon the discrete functions of Zipf's law (Pr=1/m), its distribution at the long tails are effected by the total numbers of the sampling data N. Table-1 shows "A-B rule", by parameter N. When the sampling data N increases in number, the A value of "A-B rule" become larger with much concentration at heavy tops. For examples, when N=50 and N=3000, then (70-30 rule) and (80-20rule) are calculated by Eq (5) respectively.

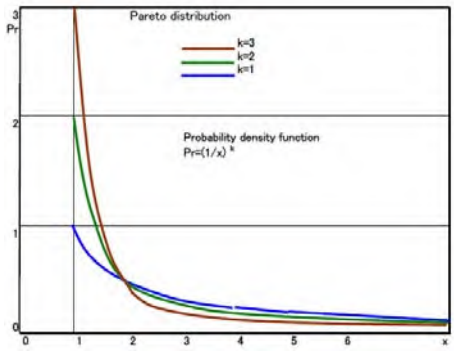

Figure-1 Pareto distribution (k=1, 2, 3)

$Pr=(1/x)^{k}$

Table-1 Pareto law and sampling data N

Pareto low (A-B) :N=Number of sampling data

Sampling data N	Head Length A(%)	Head Area B(%)	Tail Length B(%)	Tail Area A(%)	Pareto law
10	40	60	60	40	(40-60):N=10
30	33	66	66	33	
50	30	70	70	30	(30-70):N=50
100	28	72	72	28	
1000	22	78	78	22	(22-78):N=1000
2000	21	79	79	21	
3000	20	80	80	20	(20-80):N=3000
10000	18.4	81.6	81.6	18.4	
22000	18	82	82	18	

Length=x Area=Log x

2. Language: English, music and common languages

2.1 Ranking of the highest usage of English words

Figure-2 shows the relationship between sampling data N and the cumulative distribution Log (N).

When N=22000(words), SUM=Log (N) =10.

In this case, occurrence probability is given by Eq (2). It is said that the ranking (n=1, 2, 3, 4) of the most use words in English sentence are as follows (Pr=10/n (%)):

the (10/1%), of (10/2%), and (10/3%), to (10/4%)

2.2 Essential English words due to Pareto law (Figure-2)

Among 22,000 essential words in English, Pareto law (18-82 rule) are available to use (Figure-2). The 4,000 major words (4,000/22,000, 18%) are frequently used, appearing in the 82% of all the sentences. For extensive progress in English conversation, intensive exercise and mastering of the most used words of the 20% out of the essential words are successfully effective and efficient.

N	LN(x)	N/22000	
1	0		
2	0.693		
2.7183	1.000		e
10	2.303		
100	4.605		
1000	6.908		
3847	8.255	0.175	exact solution
3900	8.269	0.177	
4000	8.294	0.182	major estimate
10000	9.210		
15000	9.616		
20000	9.903		
22000	9.999	1.000	essential words
100000	11.513		

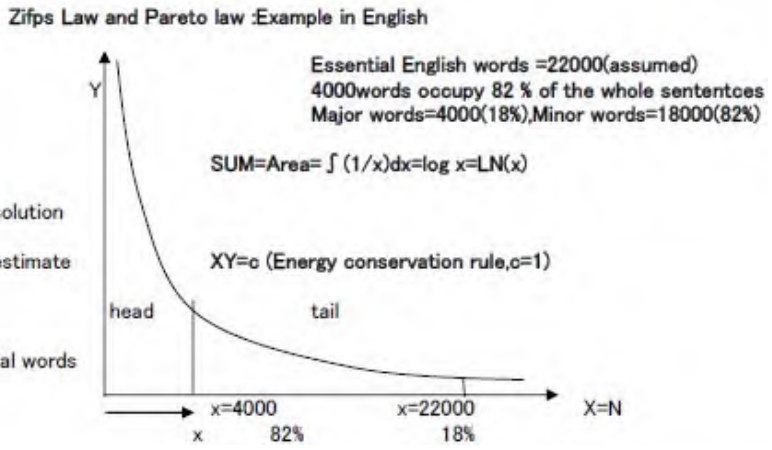

Figure-2 Zipf's law and Pareto law (Example: Distribution of English words)

2.3 English words and alphabet initials: top4, s(13.5%), c(9.1%), p(9.1%), t(6.3%)

The author roughly and quickly counted the relationship between English words and alphabet initials by pages, in the Webster's dictionary (Merriam, 3rd edition, 1972, about 1000 pages). The alphabet initial groups,(a,b,c,d),(r,s,t),(m,p) counts about 1/4,1/4,1/7 of the total pages, respectively. Total summation of 9 initials (a,b,c,d,r,s,t,m,p) words (9/26=0.35) account for the 65%(1/4+1/4+1/7=0.65) of the whole words(26). Distribution of English words with alphabet initials is due to 65-35 rule (LN (9)/LN (26) = 0.67 by Pareto law Eq (5)).

2.4 Common languages: Communication tools by speaking, writing and singing

As a result of human activity, and as communication tools, the languages originated from speaking (ears-mouth though voice sounding, singing) to writing (eyes-hand through handworks), since then later, reversely from writing to speaking(like Chinese characters, 100,000 words, BC4000). Languages have meaning and sound. Its originality comes from logogram (figure, symbol), pictogram (graph, illustration) and stenography (shorthand notes, symbol). Progress of letters and characters in English history is as follows:

A) Logogram (symbol, $)

B) Letter (alfabeto romano, A, B, C, BC1700~1500) and character (graphic symbol, mark, ?)

C) Syllabary (syllabus and word, pro-mote)

D) From (A, B, C) to (a, b, c, BC500); For speed-up writing by spelling from left to right.

For system design of common language, it requires logogram (algorism), syllabary (syllabus) and letters and characters (word unit). Pictograms are also required by pictures and illustration, rather than writing. For easy understanding, user systems should be revised again from backward to forward, from writing to sounding. Singing and sounding music are also communication tools for human being. Music is composed of speaking, melody and sound (pitch, loudness, tune, tonic, major and minor keys). It is said that performance and composition rules of music are due to Zipf's law and Pareto law as a sort of natural language. Sentences and music are so well organized that when they are not functioning well, they are

called broken English or broken keys. The keyboard arrangements of the piano and typewriters are originally closely related to the workability of hand and thumb as human activity.

3. Globalization: Common wealth and income inequality

3.1 Globalization

Globalization refers to the increasingly global relationships of culture, people and economic activity. It refers to the global production and distribution of goods and services, through reduction of barriers to international trade such as tariffs and export fees. It contributes to economic growth in developed and developing countries through increased specialization and the principle of comparative advantages. It also refers to the transnational circulation of ideas, languages and popular cultures.

The globalization of the market has positive and negative consequences in the developed countries. White color workers (engineers, attorneys, professors, executives, journalists, consultants) were able to compete successfully in the world market and command high wages. Conversely, production workers and service workers were unable to compete directly with much lower-cost workers in developing countries. Low-wage countries gained the low-value added element of work formally done in rich countries, while higher-value work remained. The total number of people employed in manufacturing in the US declined, but value added per worker increased. Wealth stands on each status in clusters of people, whereas income stands on each skill of individuals.

3.2 Common Wealth (Figure-3)

UNESCO (United Nations, Educational, Scientific Cultural Organization, 2005) has reported the common wealth in the world (world population 6.4 billion):

Class A: rich people (USA nation), 6% of world population, 59% share of world wealth

Class B: middle class people, 74% of world population, 39% share of world wealth

Class C: poor people, 20% of world population, 2% share of world wealth

Figure-3 shows the praxis and theoretical values due to Zipf's law, in 3 cases (N=100, 1,000, 6.4billion). When N=1,000, theoretical values match well with the above UNESCO report. In this case, note that there exists 1000 different wealth levels of the clusters, not of individuals in the world. If common market is open widely to the districts, concentrations of wealth will become smaller by the barrier-free effects. In Figure-3, when distribution moves from case-2 (N=1,000) to case1 (N=100), then top down is expected to be 0.593/1.5=0.39, bottom up is expected to be 0.032*1.5=0.048 by the wider effects.

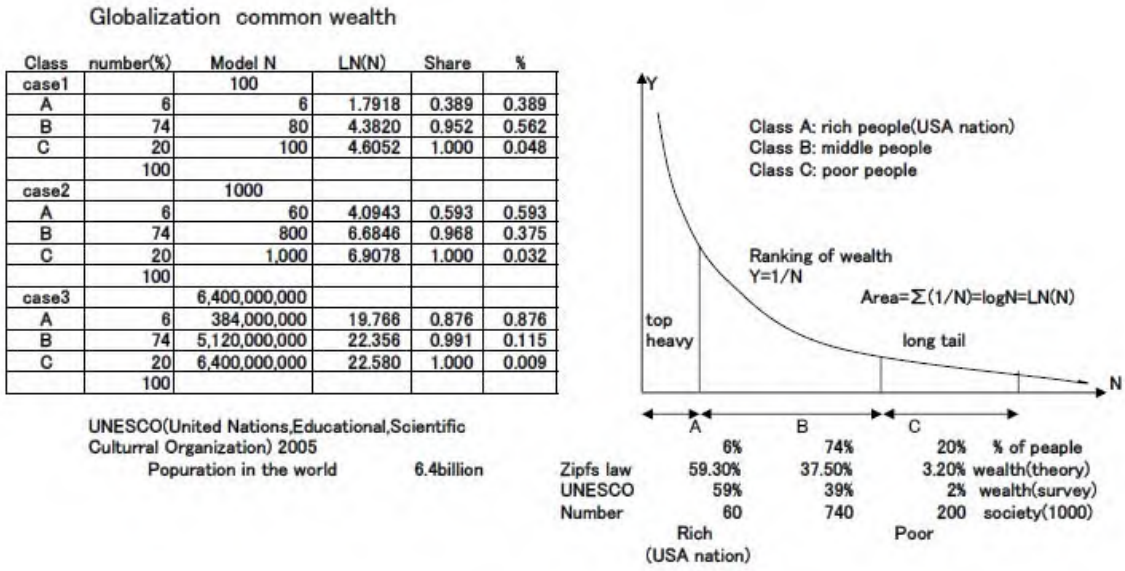

Figure-3 Globalization and common wealth

3.3 Income inequality

At the same time, it increased income inequality, both between and within nations. Incomes in the lower deciles of the world distribution have probably fallen absolutely since 1980's. The number of people living on less than $1 a day had held at 1.2 billion from 1987 to 1998. The distribution of global income is very uneven, with the richest 20% of the world's population sharing the 82.7% of the world's income. Income distribution matches well with N=10,000 (Table-1), whereas wealth distribution matches well with N=1,000 (Table-1, Figure-3). This fact tells us that globalization makes regional wealth even, at the same time reversely makes income uneven. It seems that this difference results from the two major reasons; 1) wealth=income+properties (land, house, saving), 2) wealth stands on each status of the people at regional clusters, whereas income stands on each skill and labor of individuals. Income inequality results in both international and domestic problems. Globalization produces both merit and demerit, resulting in trade-off problems.

4. Population and urban cities (Table-2, Table-3)

4.1 Fukushima earthquake disasters (2011): People lost income, wealth, family+community

Population is the cause and effect problem, essentially due to movement of the people from one place to another for better life than the present states. The Eastern Japan Earthquake (2011.3.11) caused the huge disasters duplicated with the waves of Tsunami and the failures of the atomic power plants. Recent government statistics (2012.3.6, death 15854, not found 3155, refugee 343935) predict that future population at Fukushima prefecture (2040) will be as low as 50% of the present (2010).The disasters have separated families; young generations moved out to the safety zones, mostly to urban cities for education at school, whereas parent generations and senior citizens stay at home town for working and living, keeping their life styles, while mother generations reside at both sides. Those phenomena accelerate decrease and increase in future population by local change of birth and death ratio. If the birth and death rates and immigration rates from and to overseas are kept in constant, the domestic population would be kept unchanged globally.

4.2 Population analysis by experienced theory and praxis

As theoretical data, Zipf's law are used and compared to the praxis data at the large seven cities (N=7) in the countries. Evaluations are as follows;

1) Comparison between theory (Zipf's law value) and praxis (p): distribution at each ranking (1/m), total summation up to the 7th ranking (SUM) ,praxis/theory.
2) Density of population (p/nation): urbanizing and rural tendency, concentration to seven large cities (CY=SUM/nation), oasis town phenomenon (hamlet/village).
3) Common community: barrier free, flexibility to flow.

Usually, the theory matches well with praxis. As a result of human behavior, the difference between theory and praxis tells us their traditional and historical background of politics, economics, natural and social environments.

4.2.1 USA and Japan types :Good agreement with theory and praxis (Table-2)

Even though some differences at each ranking are observed, total summation (SUM) of praxis matches well with theory (praxis/theory, USA 99.4%, Japan 96.8%). Similarity exists between them; 1) borderless (bordered by oceans), 2) free market in domestic zones, 3) equal opportunity to get jobs with higher education. Good democracy promises natural movement of people within domestic regions. NY and Tokyo are good and well populated healthy measures for estimation of urbanizing of the barrier free country.

4.2.2 Germany and France types: Agreement with theory and praxis (Table-2)

Some differences at each ranking are observed. Difference of SUM between theory and praxis are 105% (Germany) and 85% (France), which mean gradually urbanizing in Germany (CY=0.114) and slightly rural tendency in France (CY=0.077).

4.2.3 UK and Austria types: London and Vienna are so large (Table-2)

London and Vienna are so big that ranking 2 and its bellows are scarcely populated. Difference of SUM between theory and praxis are 56% (UK) and 58% (Austria). Some similarities exist between London and Vienna; the political, economical and military base have been founded there under the strong dynasty (Elizabeth, Haus Habsburg) and dominated European countries for a long time. Even though both cities are so large from domestic view points, they are on good standing in European circle (Table-3) where London keeps top ranking of championship .Urbanizing index (CY=0.176) in UK is similar to Japan.

4.2.4 Finland and Sweden types: Scandinavian and arctic districts (Table-3)

Even though the cold climate promotes concentration of people in urban districts, particular differences exist between Finland and Sweden; Difference of SUM between theory and praxis are 113% (Finland, tail heavy) and 75% (Sweden, top heavy). 13.5 % of Swedish gathers together and lives in Stockholm with high concentration, whereas other cities are scarcely populated. Reversely, in Finland people widely distribute into many urban cities like oasis town in the deserts (hamlet/village). Stockholm and London have the same population density of CY=0.12~0.13. Scandinavian (Sweden, Denmark, Norway) and UK have the same roots and origin of Anglo-Saxon.

USA and Japan Type: Good agreemet with theory and praxis, borderless type

N	USA(2010)	population p	Zipfs law 8175000/N	density p/310383000	N	Japan(2010)	population p	Zipfs law 8965000/N	density p/128000000
1	New york	8,175,000	8,175,000	0.0263	1	Tokyo	8,965,000	8,965,000	0.0700
2	Los-Angeles	3,792,000	4,087,500	0.0122	2	Yokohama	3,691,000	4,482,500	0.0288
3	Chicago	2,695,000	2,725,000	0.0087	3	Osaka	2,671,000	2,988,333	0.0209
4	Houston	2,099,000	2,043,750	0.0068	4	Nagoya	2,266,000	2,241,250	0.0177
5	Philadelphia	1,526,000	1,635,000	0.0049	5	Sapporo	1,906,000	1,793,000	0.0149
6	Phoenix	1,445,000	1,362,500	0.0047	6	Koube	1,544,000	1,494,167	0.0121
7	San-Antonio	1,327,000	1,167,857	0.0043	7	Kyoto	1,474,000	1,280,714	0.0115
Σ		21,059,000	21,196,607	0.0678	Σ		22,517,000	23,244,964	0.1759

Germany and France Type:Agreement with theory and praxis,urban and rural type

N	Germany(2008)	population p	Zipfs law 3431000/N	density p/82302000	N	France(2006)	population p	Zipfs law 2181000/N	density p/62787000
1	Berlin	3,431,000	3,431,000	0.0417	1	Paris	2,181,000	2,181,000	0.0347
2	Hamburg	1,772,000	1,715,500	0.0215	2	Marseille	839,000	1,090,500	0.0134
3	Munchen	1,326,000	1,143,667	0.0161	3	lyon	472,000	727,000	0.0075
4	Koln	995,000	857,750	0.0121	4	Toulouse	437,000	545,250	0.0070
5	Frankfurt	664,000	686,200	0.0081	5	Nice	347,000	436,200	0.0055
6	Stuttgart	600,000	571,833	0.0073	6	Nantes	282,000	363,500	0.0045
7	Dortmund	584,000	490,143	0.0071	7	Strasbourg	272,000	311,571	0.0043
Σ		9,372,000	8,896,093	0.1139	Σ		4,830,000	5655021	0.0769

UK and Austria Type: London and Wien ,Top heavy type

N	UK(2007)	population p	Zipfs law 7554000/N	density p/62035000	N	Austria(2007)	population p	Zipfs law 1664000/N	density p/8393000
1	London	7,554,000	7,554,000	0.1218	1	Wien	1,664,000	1,664,000	0.1983
2	Birmingham	989,000	3,777,000	0.0159	2	Graz	247,000	832,000	0.0294
3	Glasgow	604,000	2,518,000	0.0097	3	Linz	189,000	554,667	0.0225
4	Liverpool	468,000	1,888,500	0.0075	4	Salzburg	149,000	416,000	0.0178
5	Leeds	460,000	1,510,800	0.0074	5	Innsbruck	118,000	332,800	0.0141
6	Sheffield	449,000	1,259,000	0.0072	6	klagenfurt	92,000	277,333	0.0110
7	Edinburgh	441,000	1,079,143	0.0071	7	Wels	59,000	237,714	0.0070
Σ		10,965,000	19,586,443	0.1768	Σ		2,518,000	4,314,514	0.3000

Table-2 Population at urban cities (USA, Japan, Germany, France, UK, Austria)

4.2.5 European Type: Western and eastern circles (Table-3)

Difference of SUM between theory and praxis are 107% (Eastern) and 105% (western); nearly similar distribution indicates that the incorporated large communities have been reasonably formed at the present time. Eastern circles are located deep in the land and their climate is closely related to the arctic circles. Most of Eastern people live in urban cities and their distributions of population are like Finland.

4.2.6 Chinese type: Heavy long tail, state (region) independent (Table-4)

Difference of SUM between theory and praxis are 166% (China) and 105% (state). It is unreasonable to think that the present China is a single community. It seems that some of the barriers (politics, economics, natural and social environments) exist between and within the domestic regions which prevent incorporated communities locally and globally. Table-4 shows the state division case which indicates good agreement between theory and praxis. The present China is in the form of united states which is independent from each other with some barriers, standing on different traditions, local languages and unique cultures.

4.2.7 Religion Type: Christian, Islam, Hindu and Buddhism (Table-4)

Table-4 indicates as follows:

1) Islam has increased in population rapidly from19% (2002) to 22%(2009)
2) Ratio of Hindu+Buddhism (19%) is totally in good balance with the theoretical value.
3) Ratio of Buddhism is kept in constant (5~6%).

Population changes due to physical movement of people, whereas religious population is based upon physical and spiritual movement of people. Religion is orally transmitted from generation to generation among natives and nations through families. Wherever they move and live, their belief is usually consistent. The population of religious people highly depends on the origin and races of the people,

primary on their birth and death ratio. Religious people are rapidly increasing in absolute numbers in the world.

Finland and Sweden Type: Scandinavian and arctic districts

			Zipfs law	density				Zipfs law	density
N	Finland (2005)	population p	589000/N	p/5364000	N	Sweden(2005)	population p	1252000/N	p/9250000
1	Helsingfors	589,000	589,000	0.1098	1	Stockholm	1,252,000	1,252,000	0.1354
2	Esbo	248,000	294,500	0.0462	2	Goteborg	510,000	626,000	0.0551
3	tammerfors	213,000	196,333	0.0397	3	Malmo	258,000	417,333	0.0279
4	Vanda	200,000	147,250	0.0373	4	Uppsala	128,000	313,000	0.0138
5	Abo	177,000	117,800	0.0330	5	Vasteras	107,000	250,400	0.0116
6	Uleaborg	142,000	98,167	0.0265	6	Gavie	98,000	208,667	0.0106
7	Jyvaskyla	131,000	84,143	0.0244	7	Linkoping	97,000	178,857	0.0105
Σ		1,700,000	1,527,193	0.3169	Σ		2,450,000	3,246,257	0.2649

European Type : Western and Eastern circles

	Tail heavy type		Zipfs law			Tail heavy type		Zipfs law	
N	East Eu(2005)	population p	8290000/N		N	West Eu.(2005)	population p	7170000/N	
1	Moskva	8,290,000	8,290,000		1	London	7,170,000	7,170,000	
2	Sankt Peterbur	4,680,000	4,145,000		2	Berlin	3,390,000	4,145,000	
3	Kiev	2,590,000	2,763,333		3	Madrid	2,940,000	2,763,333	
4	Sofia	2,260,000	2,072,500		4	Rome	2,460,000	2,072,500	
5	Bucharest	1,990,000	1,658,000		5	Paris	2,130,000	1,658,000	
6	Budapest	1,750,000	1,381,667		6	Hamburg	1,730,000	1,381,667	
7	Warszawa	1,610,000	1,184,286		7	Wien	1,560,000	1,184,286	
Σ		23,170,000	21,494,786		Σ		21,380,000	20,374,786	

Table-3 Population at urban cities (Finland, Sweden, Western and Eastern Europe)

Chinese Type: State(region) independent ,Heavy Long tail type

			Zipfs law	2005		Tail heavy type		Zipfs law	2007(1.3billion)
N	Region	population p	3981000/N		N	China(2007)	population p	9595000/N	p/1300000000
1	Shenyang	3,981,000	3,981,000		1	Shanghai	9,595,000	9,595,000	0.0074
2	Dalian	2,118,000	1,990,500		2	Beijing	7,296,000	4,797,500	0.0056
3	Anshan	1,287,000	1,327,000		3	Hong Kong	6,780,000	3,198,333	0.0052
4	Fushum	1,244,000	995,250		4	Tianjin	5,066,000	2,398,750	0.0039
5	Benxi	831,000	796,200		5	Wuhan	4,488,000	1,919,000	0.0035
6	Fuxin	689,000	663,500		6	Guangzhou	4,154,000	1,599,167	0.0032
7	Jinzhou	689,000	568,714		7	Shenyang	3,981,000	1,370,714	0.0031
Σ		10,839,000	10,322,164		Σ		41,360,000	24,878,464	0.0318

Relegion in the world (2002,2009) :Christian,Islam,Hindu and Buddhism

	2002(6.4billion)		Zipfs law	density		2009(6.75billion)		Zipfs law	density
N	religion	population p	2040000000/N	p/6400000000	N	religion	population p	2254000000/N	p/6750000000
1	Christian	2,040,000,000	2,040,000,000	0.319	1	Christian	2,254,000,000	2,254,000,000	0.334
2	Islam	1,230,000,000	1,020,000,000	0.192	2	Islam	1,500,000,000	1,127,000,000	0.222
3	Hindu	830,000,000	680,000,000	0.130	3	Hindu	913,600,000	751,333,333	0.135
4	Buddhism	360,000,000	510,000,000	0.056	4	Buddhism	384,000,000	563,500,000	0.057
Σ		4,460,000,000	4,250,000,000	0.697	Σ		5,051,600,000	4,695,833,333	0.748

Table-4 Population in china and Religion in the world (Christian, Islam, Hindu, Buddhism)

5. Business model: Hardware and software business

5.1 Outline

There exist two-way methods for engineering and system approaches;

1) Deductive method: It leads away particular details from general principles and known facts, by forward going from cause to result. Production system and praxis are always going forward in parallel with time integration.
2) Inductive method: It leads on general principles from one's experience, by going backward from result to cause. It makes experienced principle, theory and law.

Herein, deductive methods are newly proposed for organizing business models using Zipf's distribution curve (Figure-4). In the production (value chain) and sales (supply chain) flows of the goods, Pareto rule

is available in many fields, particularly to size (large to small), weight (heavy to light) , quantity (many to few) and quality (good to bad, old to new) problems: A) productivity and workability of 3M (man, machine, money), B) knowhow of engineering, science and technology, C) innovation and investment to the new and the old, D) advertising and sales output. The above majors (20%) work well and do the 80%of whole jobs and contributions effectively and efficiently. The remains (80%) work and support the 20% of the whole jobs directly or indirectly. The curve (Figure-4) is divided into 3 regions; 1) region A: head portion, 2) region B: trunk (boundary) portion, 3) region C: tail portion.

5.2 Hardware business (Figure-4)

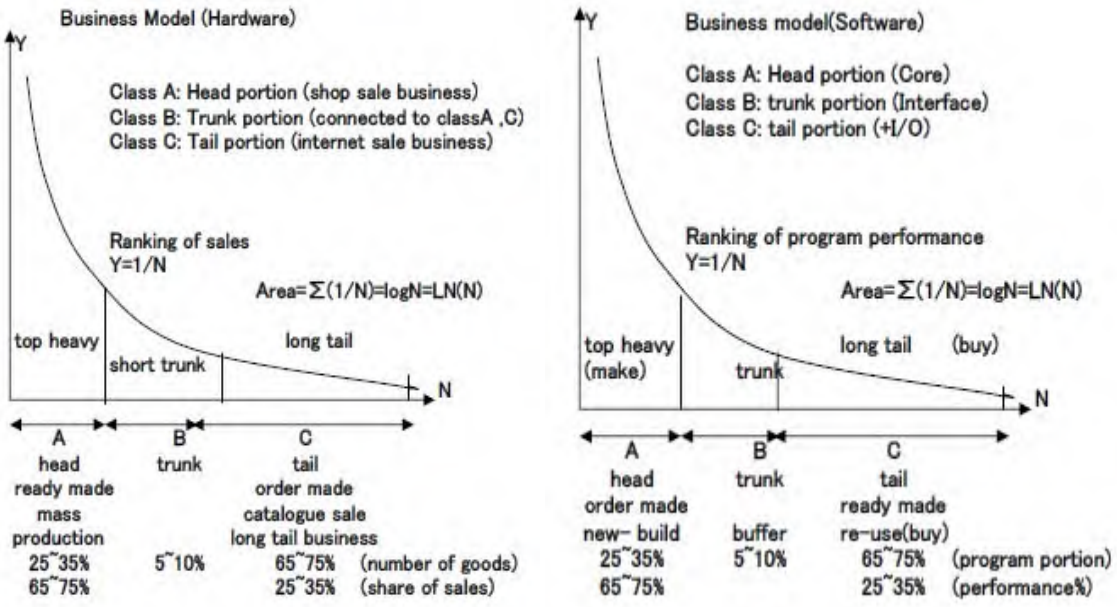

Figure-4 Business model (Hardware and Software)

N is defined as ranking of sales of the different types of goods. Pareto law (70-30 rule) says that 30% of the total clients buy 70% of whole sales so that sales focus should be on the needs of the rich clients. Figure-4 illustrates relationship between number of quantity (N) and share (Log(x)) of the different goods. Pareto rule is determined by N which is total numbers of different goods on sale. When N=20, then P=7/20=0.35, Q= 13/20=0.65. LN (7)/LN (20) =0.65, Pareto law is (65-35 rule). Based upon the answer, Clusters A, B, C is initialized to deal with 6, 2, 12 different goods respectively. For example, trunk portion plays a buffer role connected to head and tail sales. First, the 35%of of goods (7) are readily made in line of mass-production in yards and then in line of supply chain. The rest 65% of goods (13) are orderly made when requested by clients and then directly supplied to the clients. Cluster A (6) are on sale at stores, whereas Cluster C (12) are on internet sale (long tail business) by use of catalogues. Cluster B (2) are for both sales as buffer and changeable to cluster A (6) or C (12), depending on sales output. The trunk sales at cluster B (2) are available to whole-sale or retail depending on the market.

5.3 Software business (Figure-4)

When the system is composed of a variety of programs, it is very important to define N what ranking it is, and how it is determined. Here, let us define that N is critical and crucial ranking of performance by the system research based upon quality, cost and delivery. Life of software is very short compared to the hardware, maybe 3~5 years. Life-cycle cost (LCC) includes new built and maintenance. Pareto law (80-20 rule) says that the 80% of programs are made within the 20% of whole schedule and the rest 20%

requires the 80 % of total working time. Figure-4 illustrates a software business model. Assume that the program is composed of 20~100 sub-programs. In this scale, Pareto law change from (65-35 rule) to (72-28 rule). Head portion are orderly and newly made, reversely tail portion is readily made and sometimes re-used by purchase. Trunk portion is connected to both head and tail portion, sometimes interfaces between core and I/O processing. Its arrangement and each required performance highly depend on the system research.

6. Conclusion

1) Zipf's law and Pareto law are natural principles based upon the experience. Those experienced theories are available in many fields and situations, particularly to size (large to small), weight (heavy to light), money(rich to poor), quantity (many to few) and quality (good to bad, old to new) problems, where potential energy are reserved and some equilibrium are found.

2) Based upon the experienced theory and praxis, three topics are studied; A) Language and words, B) Common wealth and inequality by globalization, C) Population at urban cities. The theory matches well with praxis. As a result of human behavior of the people, the difference between theory and praxis tells us their traditional and historical background of politics, economics, natural and social environments.

3) Globalization contributes to potential increase of wealth in the regional districts and bottom up of the working people at each cluster in the developing countries. At the same time it produces income inequality with a large difference between the high-wage professionals and the low-wage workers (sometimes called as working poor) in the developed countries.

4) Business models can be proposed both for hardwares and softwares, based upon the experienced theory in production and sales flow of goods to many fields; A) productivity and workability of 3M (man, machine, money), B) knowhow of engineering and technology, C) innovation and investment to the new and the old, D) advertising and sales output.

5) The experienced theories are available both to the deductive and inductive approaches. The deductive method leads away particular details from general principles and known facts, by going forward from cause to result. The inductive method leads on the general principles from ones experience, by going backward from result to cause.

References

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Common Languages: Natural Languages and Invented Languages

Tastsumasa Takaku

Bridges of linking people: Borderless in UERO
1) border 2) money(currency) 3) common language

Borderless: to be common

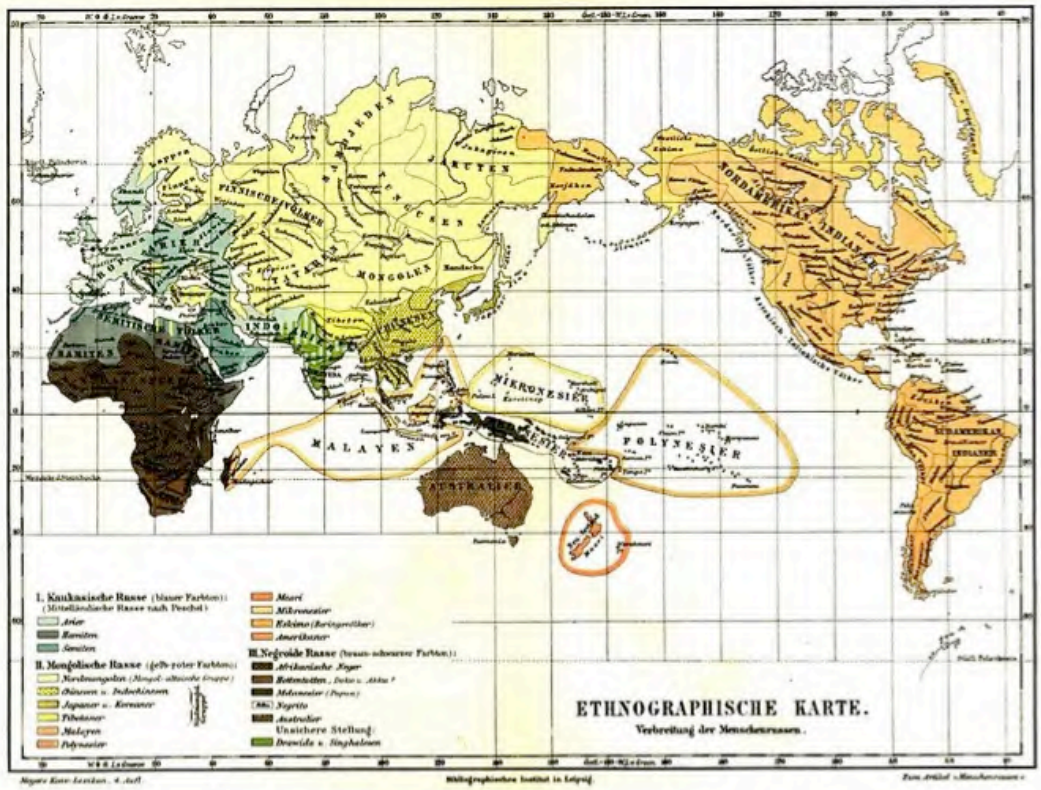
1.Human activity: for better life, natural laws
2.Right: 1)liberal and freedom
2)equality (wealth ,tax, properties)
3)survival right (life ,health and existence)
3.Borderless:forming urban districts
1)politics(military, land, border)
2)economics(wealth, income, tax)
3)social environments (culture, languages)
4)natural environments(life style, climate)

Oeresund Bidge(2000,7km): Between Sweden(Bridge) and Denmark(turnel)
Gate: North sea and Baltic sea
Tariff (1429~1857) for ships by Denmark side

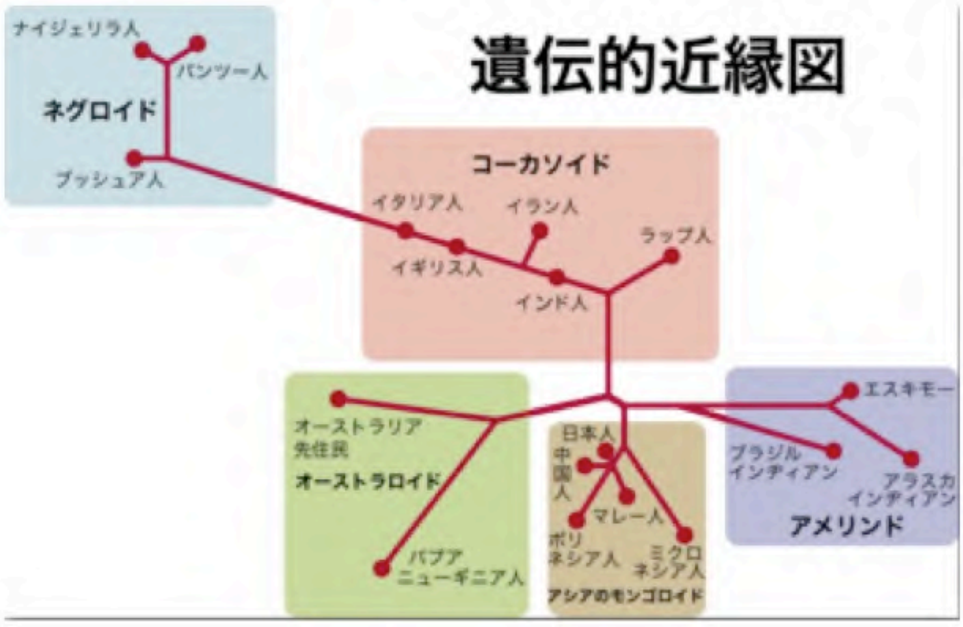
Language Level

1.Natural languages: English, Japanese,
2000~4000 languages in the world
2.Invented languages
1)Esperanto:Zamenhof(1859~1917)
2)Lojban:1987(start),1997(grammar),2002(praxis),for communication and computer,Loglan(1977~1987)
3.Computer system languages
1)procedure oriented languages
2)problem oriented languages
4. Pictogram
5. Music

Roots of human races From Africa



Origin: human races



Origin:
Old and New mongoloid

Languages in the world
Praxis/theory=0.93~1.11(long tail distribution)
N=2000~4000

Language in the world

Population:
Million (world 6700million)

N	1/N	language	A (million)	B (Zipf's law)	ΣA/ΣB
1		Chinese	1300	1300	1
2		English	510	650	0.928
3		Hindu	490	433	0.965
4		Spanish	420	325	0.995
5		French	410	260	1.054
6		Russia	280	217	1.070
7		Arabic	250	186	
8		Bengal	210	163	
9		Portugal	190	144	
10		Indonesian	180	130	
SUM			4240	3808	1.110

Common languages Distribution and Localization

Religion and native languages

Religion revolution: Martin Luther(1517)

Bible(Latin to Germany) and choral: Original Germany bases

UK and France: to English and French

Buddhism : not translated to Japanese yet

Religious belief: globally distributed(globalization)

Communication tools: localization to native languages(local culture+ tradition+ customs)

Lojban: Invented language
Logical language (for communication and computer)

Lojban: The Logical Language

Lojban is a carefully constructed language designed with the intention of eliminating much of the ambiguity from human communication. It is the result of five decades' worth of collective efforts by hundreds of people.

Notable features

Lojban is designed to be culturally neutral.

Lojban grammar is based on the principles of logic.

Lojban has an unambiguous grammar.

Lojban has phonetic spelling, and unambiguous resolution of sounds into words.

Lojban is simple compared to natural languages; it is easy to learn.

Lojban's 1300 root words can be easily combined to form a vocabulary of millions of words.

Lojban is designed to be culturally neutral.

Lojban is regular; the rules of the language are without exception.

Lojban attempts to remove restrictions on creative and clear thought and communication.

Lojban has a variety of uses, ranging from the creative to the scientific, from the theoretical to the practical.

Pictogram: Visual language

Picto Online – new smart Internet service. Collect the Picto images directly from Picto Online. Easy, virus-free, PC/Mac.
Go to Picto online (opens in new window)

Pictogram – a language in pictures

Welcome to the international website for Pictogram, a visual language developed for people with limited or no ability to speak, read and write.
You can understand and make yourself understood
You can ask questions and get replies
You gain support for your thoughts and memory
You can formulate feelings and wishes
You can communicate!

Pictogram in your own language

With its 1,500 picto-images, Pictogram is an international visual language which has been translated into Danish, English, Finnish, French, Icelandic, Italian, Latvian, Lithuanian, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish and German. To experience Pictogram in your language, click the appropriate flag. This will take you to Picto Online, where you can test the web service at no charge. You can then order a subscription and gain immediate access to Pictogram.
To Picto Online

Pictogram
Emergency exit(1982 made in Japan,1987 ISO)
toilet(Expo 2010,Shenyang,China)

Common Language：Music

Music song:　Yuki Saori(由紀さおり）
Animation:　Hatune Miku(初音ミク）

Communication：

sound of music+　visualization

“Music is common language in the world”

Common Language: Generation Gaps

The old: yesterday, nostalgia, classic, mild

Past (experience+ knowledge)+ head

(example): Yuki Saori (senior singer)

The young: tomorrow, future, modern, wild

New (feeling+ originality)+ body

(example): Hatune Miku(animation girl)

Music and performance

1.Basics:Key+tonic+harmony
Keys: major key(長調）、minor key(短調）
Music: composed by diatonic scale
Melody: tonal center: tonic(主音）,
Title: major key (A)+ minor key (Am)
tonality(調整）:melody+ harmony+ tonic
2. 24(30) keys:major(12)+minor(12)
3. Modulation: movement to another tonic
Head and tail: parallel key, same tonic key
4. Out of key: broken keys

Characters of music（1）
Yuki Saori

1.Melody:nostalgia,classic arrangement
Easy to remember+ simple to memory
melody (First)+ song (Second)
2.Nowadays (musical)sense:
At dismal economy:
at the crisis by the damages
USA: change dark to hopeful song
Japan: nostalgia song to remind the olds

Characters of music（2）
Yuki Saori

3.Song by languages

1) Japanese: 15000HZ, wave low, mild similar to natural sound of river flow

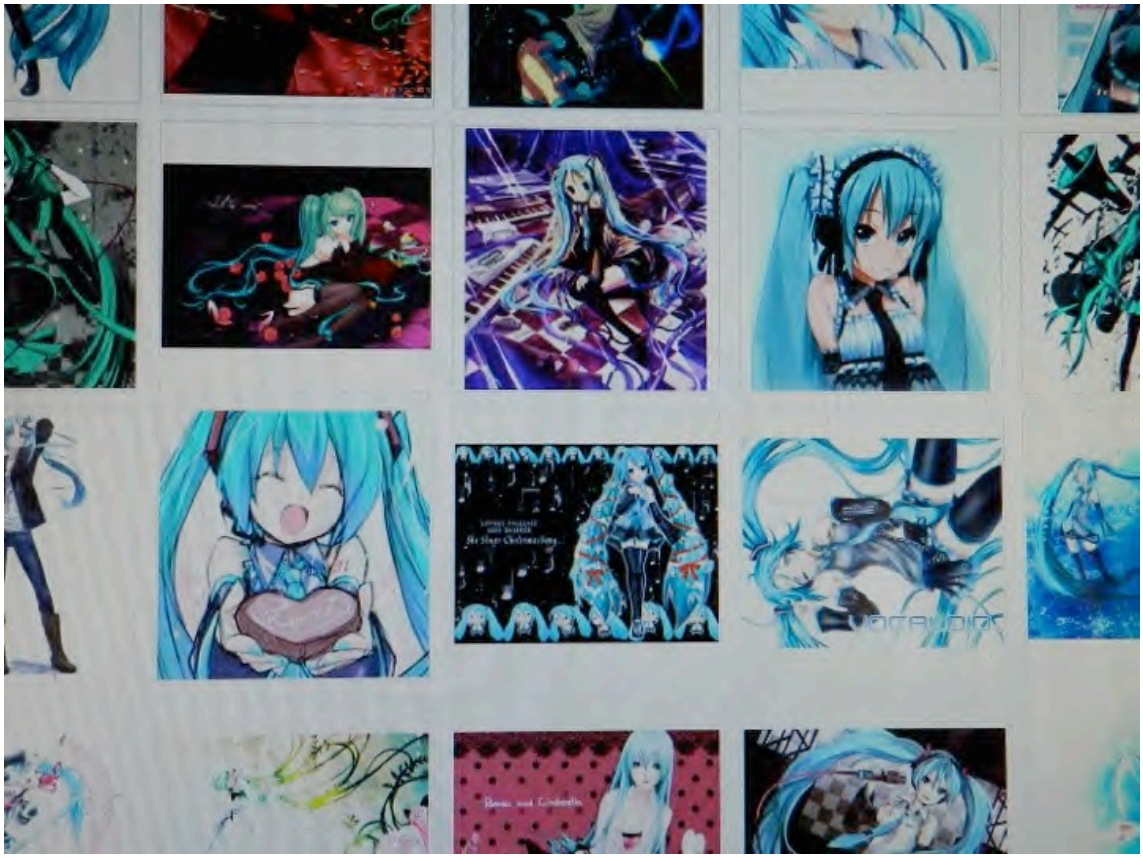
2)English natives : 20000Hz, wave high similar to sound of traffic

3）Difference between intonations of each

Sales-point of Music

1. Historical views: Karaoke music at drinking night by electronic back orchestra
2. Common songs to the world of no-understanding Japanese
3. Visualization: by animations

“Music is a common language to the worldwide people”



Animation: MIKU(初音ミク)

1. Internet business: performance+ concerts
2. Original progress: produced by many people through internets:
   song+ melody+ revival
3. Copy right: License (primary)+free (open)
4. Cartoon+animation: dynamic dancing+ singing for young as dynamite power
5. Music market: from close to open in the world

Experienced theory and Praxis of Human

Tatsumasa Takaku
Takaku Construction Co., Ltd.,
Tochigi, Japan

Abstract

1.Principle and Experienced theory:
Zipf's law and Pareto law
2.Praxis:Human activity
3.Good agreement with Principle and Praxis
4.Apllication field and Example
1)Language(English)
2)Wealth and Income
3) City population
5.Proposal:Business model

Zipf's law (Zeta distribution):

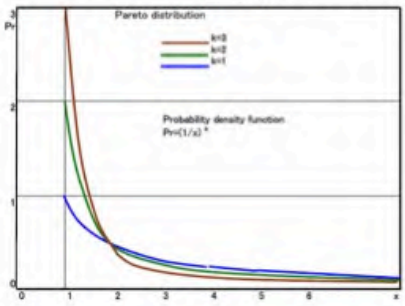
$Y(Pr) = 1/n$

$Y(Pr) = 1/1,\ 1/2,\ 1/3,\ 1/n,$

n: ranking, N=sampling data

$F(m, N) = 1/m * SUM$

$SUM = \sum(1/n)$

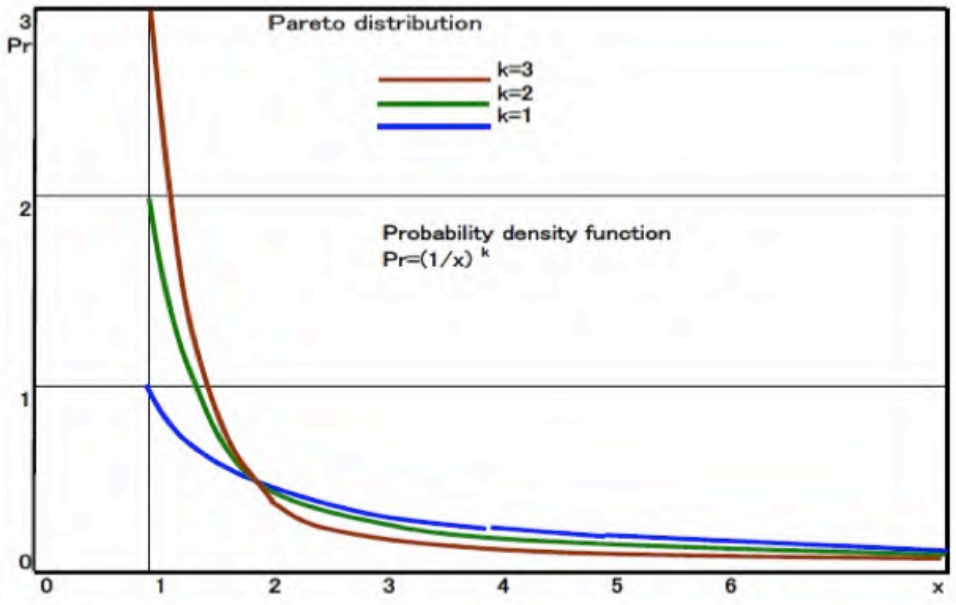


Example: Sky tree tower

Tower height in Tokyo
(sky tree 2012,50years later since Tokyo tower,
2062,1200m tower possible in Tokyo?)

N	1/N	Zipf's law	Praxis	
1	1/1	634m	634m	Sky tree
2	1/2	317m	333m	Tokyo tower
3	1/3	211m	209m	West T.tower
Sum	1.88	1162m	1176m	98.8%

Pareto Distribution



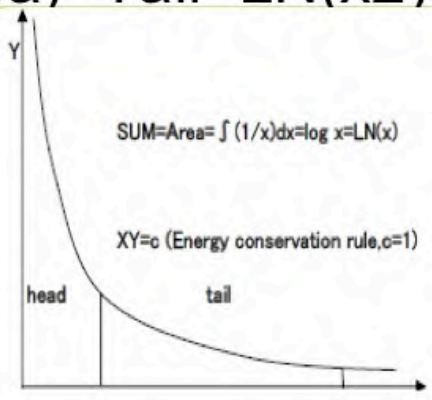
Pareto law:(A-B) rule

Cumulative distribution

$$F(x) = \int dx/x = \text{Log}(x) = \text{LN}(x)$$

A (area)=Head=LN(x1),

B (area)=Tail=LN(x2)-LN(x1)



Pareto law:(20:80)rule

1. 20% of total clients buy 80% of whole sales, the rest 80% clients buy 20% of sales (focus on good clients).
2. 20% of total employee work 80 % of jobs, the rest 80% work 20% of jobs (high and low wages)
3. 80% of programs are made within 20 % of job schedule, the rest 20% requires 80% works (with maintenance)

Pareto low
20-80 rule and others

Pareto low (A-B) :N=Number of sampling data

Sampling data	Head		Tail		Pareto law
	Length	Area	Length	Area	
N	A(%)	B(%)	B(%)	A(%)	
10	40	60	60	40	(40-60):N=10
30	33	66	66	33	
50	30	70	70	30	(30-70):N=50
100	28	72	72	28	
1000	22	78	78	22	(22-78):N=1000
2000	21	79	79	21	
3000	20	80	80	20	(20-80):N=3000
10000	18.4	81.6	81.6	18.4	
22000	18	82	82	18	

Length=x Area=Log x

Fields of application

1.Size:large to small
2.Weight:heavy to light
3.moneey:rich to poor
4.Quantity:many to few
5.Quality:good to bad, old to new

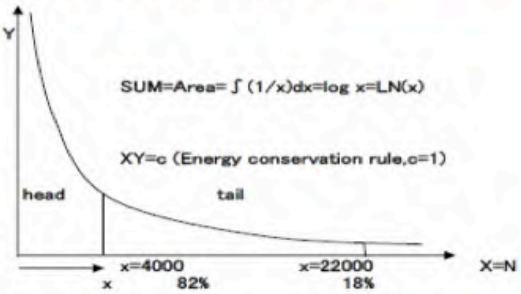
Fields of application

1.The size of human settlements
2.Hard disk drive error rates
3.The values of oil reserves in oil fields
4.Numbers of species per genus
5.Sizes of sand particles
6.Sizes of fractured pieces
7.Areas burnt in forest fires
8.Severity of large casualty losses
9.Annual maximum one-day rainfalls and river floods

Zipf's law and English

N	LN(x)	N/22000	
1	0		
2	0.693		
2.7183	1.000		e
10	2.303		
100	4.605		
1000	6.908		
3847	8.255	0.175	exact solution
3900	8.269	0.177	
4000	8.294	0.182	major estimate
10000	9.210		
15000	9.616		
20000	9.903		
22000	9.999	1.000	essential words
100000	11.513		

Zifps Law and Pareto law :Example in English



Pareto low (A–B) :N=Number of sampling data

Sampling data	Head		Tail		Pareto law
	Length	Area	Length	Area	
N	A(%)	B(%)	B(%)	A(%)	
10	40	60	60	40	(40–60):N=10
30	33	66	66	33	
50	30	70	70	30	(30–70):N=50
100	28	72	72	28	
1000	22	78	78	22	(22–78):N=1000
2000	21	79	79	21	
3000	20	80	80	20	(20–80):N=3000
10000	18.4	81.6	81.6	18.4	
22000	18	82	82	18	
	Length=x	Area=Log x			

Pareto law and English(22000 words) (major=4000, and minor=18000)

N	LN(x)	N/22000	
1	0		
2	0.693		
2.7183	1.000		e
10	2.303		
100	4.605		
1000	6.908		
3847	8.255	0.175	exact solution
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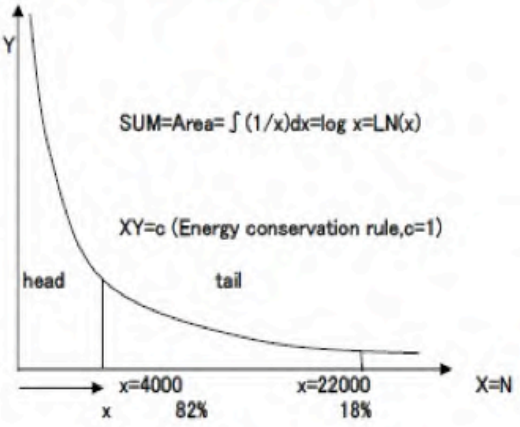
Zifps Law and Pareto law :Example in English



English words and alphabet initials

1. Group A: (a, b, c, d) ¼
2. Group B: (r, s, t) ¼
3. Group C: (m, p) 1/7

Sum=(a, b, c, d, r, s, t, m, p) ¼+1/4+1/7=0.65

Words=9/26=0.35

Pareto law (65,35) rule

Globalization : wealth and Income

1. Contribution to economic growth through increased specialization and the principle of comparative advantages.
2. Developing country: potential increase in wealth in the regional districts, bottom up of workers.
3. Developed country: Income inequality with large gaps between high-wage professionals and low-wage workers.
4. Wealth=Income+propert(house, land, stocks)
5. Cluster: wealth(N=1000),Income(N=10000)

Wealth :UNESCO(2005)

1. Class A(rich, USA)
   population 6% ,world wealth 59%(59.3%)
2. Class B(middle)
   population 74%, world wealth 39%(37.5%)
3. Class C(poor)
   population 20%,world wealth 2%(3.2%)

( ):Zipf's law ,N=1000(clusters)

Income Inequality

Rich people:

Population 20% World income 82.7%

Pareto law:(18.4-81.8) rule,

N=10000(individuals)

Wealth: stand on each status of the people at regional clusters.

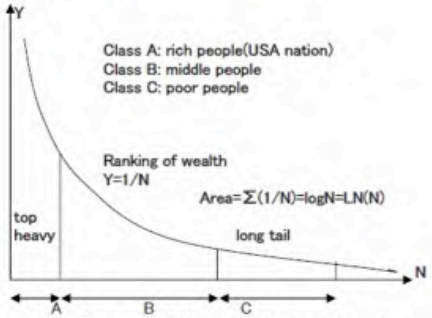
Income: stand on each skill and labor of individuals.

Globalization and Wealth

Globalization common wealth

Class	number(%)	Model N	LN(N)	Share	%
case1		100			
A	6	6	1.7918	0.389	0.389
B	74	80	4.3820	0.952	0.562
C	20	100	4.6052	1.000	0.048
	100				
case2		1000			
A	6	60	4.0943	0.593	0.593
B	74	800	6.6846	0.968	0.375
C	20	1,000	6.9078	1.000	0.032
	100				
case3		6,400,000,000			
A	6	384,000,000	19.766	0.876	0.876
B	74	5,120,000,000	22.356	0.991	0.115
C	20	6,400,000,000	22.580	1.000	0.009
	100				

UNESCO(United Nations,Educational,Scientific Culturral Organization) 2005
Popuration in the world 6.4billion



	A	B	C	
	6%	74%	20%	% of peaple
Zipfs law	59.30%	37.50%	3.20%	wealth(theory)
UNESCO	59%	39%	2%	wealth(survey)
Number	60	740	200	society(1000)
	Rich (USA nation)		Poor	

City population

USA(f=99.4%),Japan(f=96.8%),f=praxis/theory
Barrier free 1)borderless(bordered by oceans)
2)free market in domestic areas
3)free opportunity for jobs and education

city density:USA(0.0678),Japan(0.1759)

USA and Japan Type: Good agreemet with theory and praxis, borderless type

			Zipfs law	density				Zipfs law	density
N	USA(2010)	population p	8175000/N	p/310383000	N	Japan(2010)	population p	8965000/N	p/128000000
1	New york	8,175,000	8,175,000	0.0263	1	Tokyo	8,965,000	8,965,000	0.0700
2	Los-Angeles	3,792,000	4,087,500	0.0122	2	Yokohama	3,691,000	4,482,500	0.0288
3	Chicago	2,695,000	2,725,000	0.0087	3	Osaka	2,671,000	2,988,333	0.0209
4	Houston	2,099,000	2,043,750	0.0068	4	Nagoya	2,266,000	2,241,250	0.0177
5	Philadelphia	1,526,000	1,635,000	0.0049	5	Sapporo	1,906,000	1,793,000	0.0149
6	Phoenix	1,445,000	1,362,500	0.0047	6	Koube	1,544,000	1,494,167	0.0121
7	San-Antonio	1,327,000	1,167,857	0.0043	7	Kyoto	1,474,000	1,280,714	0.0115
Σ		21,059,000	21,196,607	0.0678	Σ		22,517,000	23,244,964	0.1759

City population
Germany(105%),France(85%)
Germany: gradually urbanizing(density 0.1139)
France: slightly rural tendency(0.0769)

			Zipfs law	density				Zipfs law	density
N	Germany(2008)	population p	3431000/N	p/82302000	N	France(2006)	population p	2181000/N	p/62787000
1	Berlin	3,431,000	3,431,000	0.0417	1	Paris	2,181,000	2,181,000	0.0347
2	Hamburg	1,772,000	1,715,500	0.0215	2	Marseille	839,000	1,090,500	0.0134
3	Munchen	1,326,000	1,143,667	0.0161	3	lyon	472,000	727,000	0.0075
4	Koln	995,000	857,750	0.0121	4	Toulouse	437,000	545,250	0.0070
5	Frankfurt	664,000	686,200	0.0081	5	Nice	347,000	436,200	0.0055
6	Stuttgart	600,000	571,833	0.0073	6	Nantes	282,000	363,500	0.0045
7	Dortmund	584,000	490,143	0.0071	7	Strasbourg	272,000	311,571	0.0043
Σ		9,372,000	8,896,093	0.1139	Σ		4,830,000	5655021	0.0769

City population
UK(56%),Austria(58%)
London and Vienna: outstanding, high densely populated
historical background: politics, economics, military base
Strong dynasty: Elizabeth, Haus Habsburg)
urbanizing(0.1768):similar to Japan

			Zipfs law	density				Zipfs law	density
N	UK(2007)	population p	7554000/N	p/62035000	N	Austria(2007)	population p	1664000/N	p/8393000
1	London	7,554,000	7,554,000	0.1218	1	Wien	1,664,000	1,664,000	0.1983
2	Birmingham	989,000	3,777,000	0.0159	2	Graz	247,000	832,000	0.0294
3	Glasgow	604,000	2,518,000	0.0097	3	Linz	189,000	554,667	0.0225
4	Liverpool	468,000	1,888,500	0.0075	4	Salzburg	149,000	416,000	0.0178
5	Leeds	460,000	1,510,800	0.0074	5	Innsbruck	118,000	332,800	0.0141
6	Sheffield	449,000	1,259,000	0.0072	6	klagenfurt	92,000	277,333	0.0110
7	Edinburgh	441,000	1,079,143	0.0071	7	Wels	59,000	237,714	0.0070
Σ		10,965,000	19,586,443	0.1768	Σ		2,518,000	4,314,514	0.3000

City population
Scandinavian and arc districts
Finland(113%,tail heavy),Sweden(75%,top heavy)
Stockholm (density 13.5%):high concentration
Finland: widely distributed to districts(hamlet/village)
Sweden: urbanizimg to cities

Finland and Sweden Type: Scandinavian and arctic districts

			Zipfs law	density				Zipfs law	density
N	Finland (2005)	population p	589000/N	p/5364000	N	Sweden(2005)	population p	1252000/N	p/9250000
1	Helsingfors	589,000	589,000	0.1098	1	Stockholm	1,252,000	1,252,000	0.1354
2	Esbo	248,000	294,500	0.0462	2	Goteborg	510,000	626,000	0.0551
3	tammerfors	213,000	196,333	0.0397	3	Malmo	258,000	417,333	0.0279
4	Vanda	200,000	147,250	0.0373	4	Uppsala	128,000	313,000	0.0138
5	Abo	177,000	117,800	0.0330	5	Vasteras	107,000	250,400	0.0116
6	Uleaborg	142,000	98,167	0.0265	6	Gavie	98,000	208,667	0.0106
7	Jyvaskyla	131,000	84,143	0.0244	7	Linkoping	97,000	178,857	0.0105
Σ		1,700,000	1,527,193	0.3169	Σ		2,450,000	3,246,257	0.2649

City population
Western EURO(105%),Eastern EURO(107%)
similar distribution, incorporated large communities
East EURO: urbanizing to cities like Finland

European Type : Western and Eastern circles

	Tail heavy type		Zipfs law		Tail heavy type		Zipfs law
N	East Eu(2005)	population p	8290000/N	N	West Eu.(2005)	population p	7170000/N
1	Moskva	8,290,000	8,290,000	1	London	7,170,000	7,170,000
2	Sankt Peterbur	4,680,000	4,145,000	2	Berlin	3,390,000	4,145,000
3	Kiev	2,590,000	2,763,333	3	Madrid	2,940,000	2,763,333
4	Sofia	2,260,000	2,072,500	4	Rome	2,460,000	2,072,500
5	Bucharest	1,990,000	1,658,000	5	Paris	2,130,000	1,658,000
6	Budapest	1,750,000	1,381,667	6	Hamburg	1,730,000	1,381,667
7	Warszawa	1,610,000	1,184,286	7	Wien	1,560,000	1,184,286
Σ		23,170,000	21,494,786	Σ		21,380,000	20,374,786

City population
China(166%),unit of state(105%)
China: heavy long tail, not a single community
barrier: political, economical, social natural environment
unit of state: a single community

Chinese Type: State(region) independent ,Heavy Long tail type

			Zipfs law	2005		Tail heavy type		Zipfs law	2007(1.3billion)
N	Region	population p	3981000/N		N	China(2007)	population p	9595000/N	p/1300000000
1	Shenyang	3,981,000	3,981,000		1	Shanghai	9,595,000	9,595,000	0.0074
2	Dalian	2,118,000	1,990,500		2	Beijing	7,296,000	4,797,500	0.0056
3	Anshan	1,287,000	1,327,000		3	Hong Kong	6,780,000	3,198,333	0.0052
4	Fushum	1,244,000	995,250		4	Tianjin	5,066,000	2,398,750	0.0039
5	Benxi	831,000	796,200		5	Wuhan	4,488,000	1,919,000	0.0035
6	Fuxin	689,000	663,500		6	Guangzhou	4,154,000	1,599,167	0.0032
7	Jinzhou	689,000	568,714		7	Shenyang	3,981,000	1,370,714	0.0031
Σ		10,839,000	10,322,164		Σ		41,360,000	24,878,464	0.0318

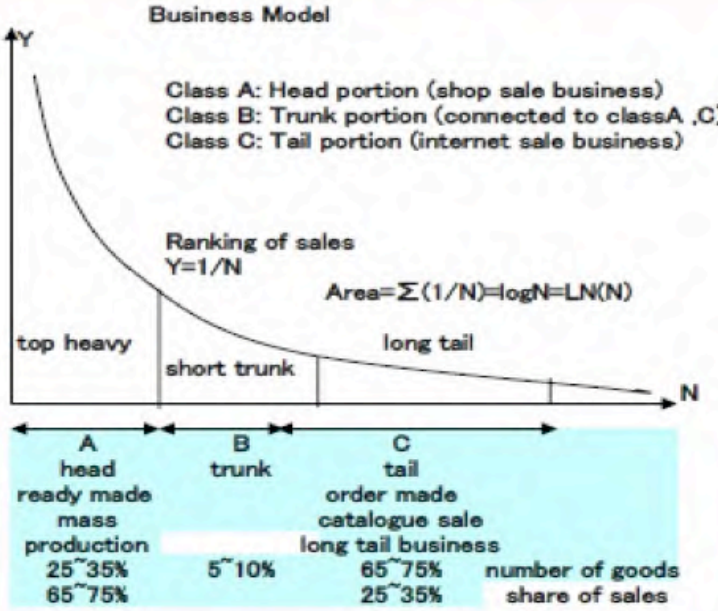
Regional population: Christian, Islam, Hindu, Buddhism

2002(105%,density 0.697)
2009(107%,density 0.748)
population: increasing (Islam)
Movement: belief problems, birth and death ratio

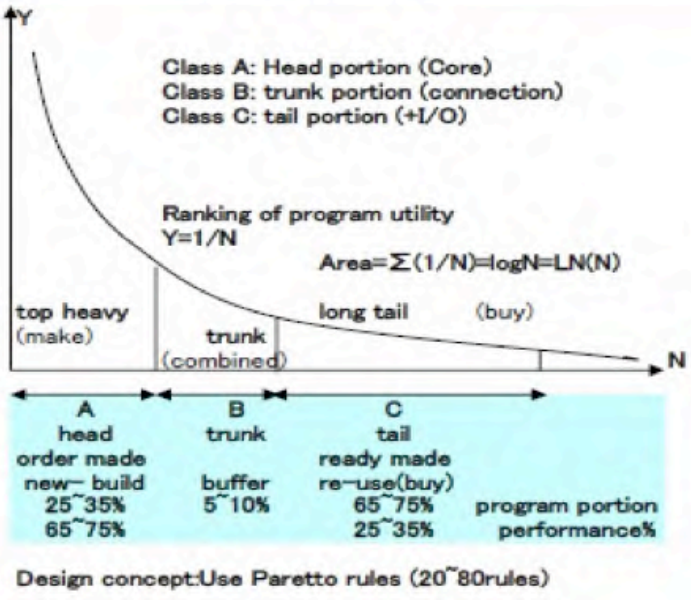
Relegion in the world (2002,2009) :Christian,Islam,Hindu and Buddhism

	2002(6.4billion)		Zipfs law	density		2009(6.75billion)		Zipfs law	density
N	religion	population p	2040000000/N	p/6400000000	N	religion	population p	2254000000/N	p/6750000000
1	Christian	2,040,000,000	2,040,000,000	0.319	1	Christian	2,254,000,000	2,254,000,000	0.334
2	Islam	1,230,000,000	1,020,000,000	0.192	2	Islam	1,500,000,000	1,127,000,000	0.222
3	Hindu	830,000,000	680,000,000	0.130	3	Hindu	913,600,000	751,333,333	0.135
4	Buddhism	360,000,000	510,000,000	0.056	4	Buddhism	384,000,000	563,500,000	0.057
Σ		4,460,000,000	4,250,000,000	0.697	Σ		5,051,600,000	4,695,833,333	0.748

Business model Hardware



Business model Software



Design concept:Use Paretto rules (20~80rules)

Zipf's law and Principle theory Why is it true?

XY=c (constant): potential energy is reserved in constant

Potential energy=work (force*displacement)

Population: Attraction to city*movement
Religion: Attraction to mind*belief
Language: Grammar (constraints)*frequency

Conclusion

1. Experienced theory are available in many fields: size, weight, money, quantity, quality
2. Example:wealth and income, language, population in city: Irregularity are found for each situations and environments.
3. Business models: proposed for hardware and software business, Head and long tail business

Team 4:
Development Process Models
A key to process and product quality

Gerhard Chroust, Austria

Keywords: software engineering, software process, models, quality, process, product, enactment

1 Development Process Models - What and Why?

A key to a successful systems engineering project is an *orderly development process* to conceptualize, design, build, and evaluate the intended system. This process has to be defined, enacted and its observation often even enforced. This includes the need to *document* the defined process with an appropriate modelling language. Obviously all project members have to follow the 'same' process. In 'classical industries' such processes have been established since long (architecture: several thousand years, car industry: 150 years). The arrival of the ICT (Information and Communication Technologoies) has added new perspectives, new challenges, and new methods [Chroust-96h, Chroust-10v], especially with respect to industries which traditionally relied on electro-mechanical implementations.

2 Development Process Models

A desired process can be described by a *Process Model*, which in itself is an *abstraction* of the common and desirable activities of past processes, containing only relevant information about the intended process. An individual process is derived ('instantiated') from the Process Model (fig. 1). The model (and its representation!) has considerable influence on the outcome of the individual process [Chroust-10v].

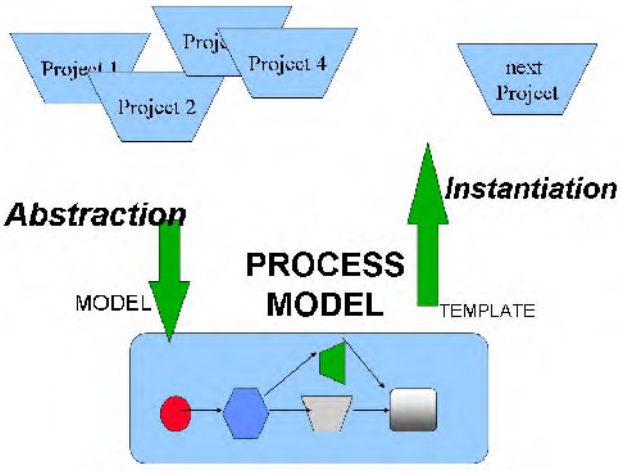


Fig. 1:

Essential properties of a modelling language with respect to the development project are: influence on the modeller's view and thinking, expressiveness, unambiguity, understandability, modularity, orthogonality, and liberality of the model concepts, effectiveness, construction and interpretation cost of the modelling process, and tractability of the model.

2.1 Process Model Components

Fig. 2 shows a metamodel of process models, describing essential components and their relationships [Chroust-10v].

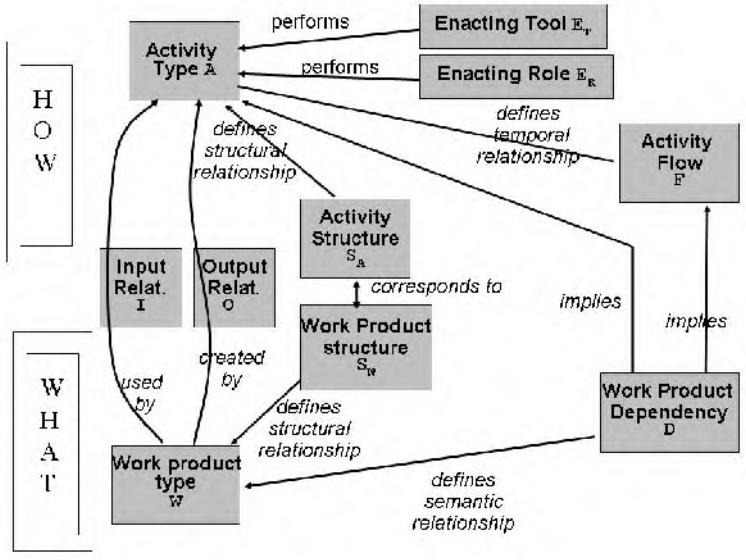


Fig. 2: A Process meta-model

Formally we can describe a process model as a octupel

$$PM = < \mathcal{W}, \mathcal{S_W}, \mathcal{D}, \mathcal{A}, \mathcal{S_A}, \mathcal{F}, \mathcal{I}, \mathcal{O} > \quad (1)$$

Traditionally the following components are provided:

Work Product Types ($\mathcal{W}$) : Work Products are to be considered as the intermediate and final persistent information created by the process. They are the basis for understanding, executing, and eventually modifying a given software product.

Work Product Dependency ($\mathcal{D} = \mathcal{W} \times \mathcal{W}$) This expresses the interdependency between work products. Examples of such relationships are "is a design corresponding to that specification", "is a submodule of", "is a compilation of...".

Work Product Structure ($\mathcal{S_W} = \mathcal{W} \times \mathcal{W}$)**:** It defines how individual work product types are embedded in a structure for ease of understanding, handling, further development, and maintenance.

Activity types ($\mathcal{A} = \mathcal{W}^* \times \mathcal{W}^*$)**:** The activity types express the *dynamics* of the development process. They describe how work products are produced from other work products. We may say that activity types express the *individual tactical steps* of software development.

Activity Structure ($\mathcal{S_A} = \mathcal{A} \times \mathcal{A}$)**:** The Activity Structure arranges activity types in a higher-order structure, usually correlated with development phases. It helps understanding the process and it structures. It splits the development process into "phases" with common objectives or views (e.g. user point of view versus the data processing point of view), typically used for better management planning and control.

Activity Flow ($\mathcal{F} = \mathcal{A} \times \mathcal{A}$) **:** The Activity Flow defines the *'development strategy'*, the desired sequence of activities. To some extent this is already pre-defined by the Input Relationship $\mathcal{I}$, the Output Relationship $\mathcal{O}$, and the Work Product Dependency $\mathcal{D}$, but there is still considerable freedom which gives raise to different development methods (see section "Navigation in Process Models").

Input and Output Relationship ($\mathcal{I} = \mathcal{W} \times \mathcal{A}$ and $\mathcal{O} = \mathcal{W} \times \mathcal{A}$)**:** These two relationships relate input and output of work products with respect an activity, i.e. which work products are used to produce other work products.

Enacting Role $\mathcal{E}_{\mathcal{R}}$: Many models provide a description of the roles individual project members have to play in order to perform the various actions. The V-Model XT [Hoehn-08], for example, defines 30 roles.

Enacting Tool $\mathcal{E}_{\mathcal{T}}$: Tools are the actual workhorse of development and are essential for providing productivity and quality. For the consistency of development it is often useful to specify which *tools* should be used for performing a given activity (e.g a specific version of a compiler or a design tool). s to perform a specific activity.

2.2 Dimensions of a process

When describing and prescribing a development process numerous aspects have to be considered. Depending on the intentions and objectives of a process model we can distinguish five main dimensions which span existing process models [Chroust-10v], see fig. 3.

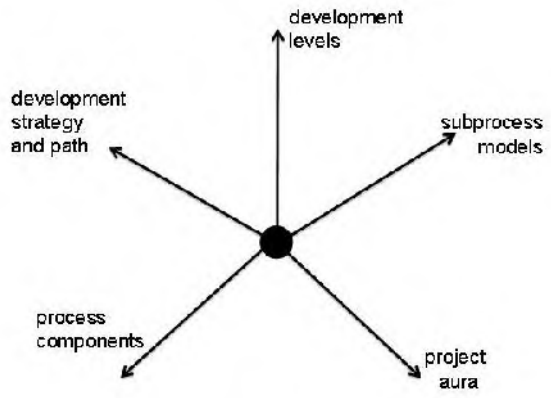


Fig. 3: Dimensions of a process model

process components see section 2.1.

development levels see section 2.3.

development strategy and path see section 2.4.

subprocess models Besides designing and implementing the software product itself Software Engineering includes numerous other activities: Documentation, Quality Management, Project Management, Configuration Management, Product Management, Human Resource Management, etc. [ISO12207-07]. These activities have to be performed in a cooperative, parallel manner, in order to guarantee the final product's desired quality, marketability etc. They are usually described by separate process models, which are intertwined with the development process model.

project aura Initially software products were developed independently from one another. Due to current system development paradigms like reuse of software components, component-based development [Cheesman-01, Crnkovic-02], Product Lines strategies [Hoyer-07, Pohl-05], outsourcing [Kobayashi-05b], etc. a project has to take into account the project's 'outside' environment: other products to be build, legacy systems, etc.

2.3 Development Levels

We can identify several 'levels' of development. Each level focusses on another aspect of the intended product [Chroust-92a, Lawson-10] with an obvious analogy to building a house (i.e. requirements, concept, specification, design, implementation, installation, integration, cf. fig. 4).

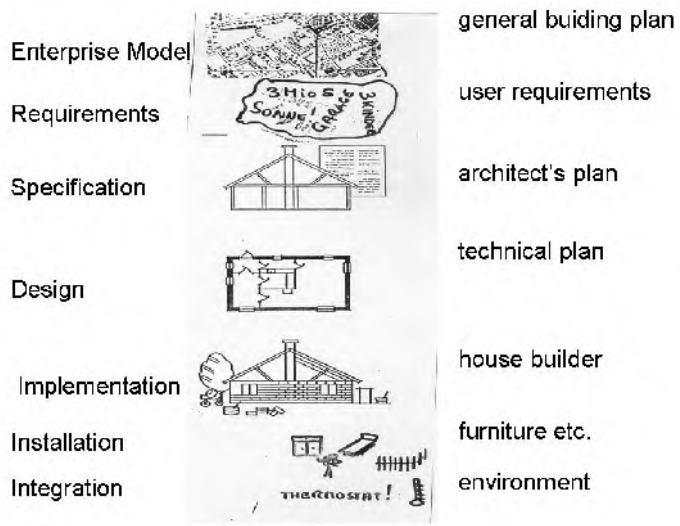


Fig. 4: House-Building und Software Engineering

2.4 Development Strategy and Path

A development process usually does not (may not?) not fully specify the order in which individual activities have to be performed, cf. [ISO15288-06]. Different approaches and strategies apply, e.g. Agile Development, Waterfall approaches [Chroust-95b, Chroust-10v].

The major contentions in the 'religious wars' about methodologies concern the *granularity* and the *sequencing* of individual activities. Different basic strategies are shown in fig. 5 [Chroust-10v], [Lawson-10, chapter 6].

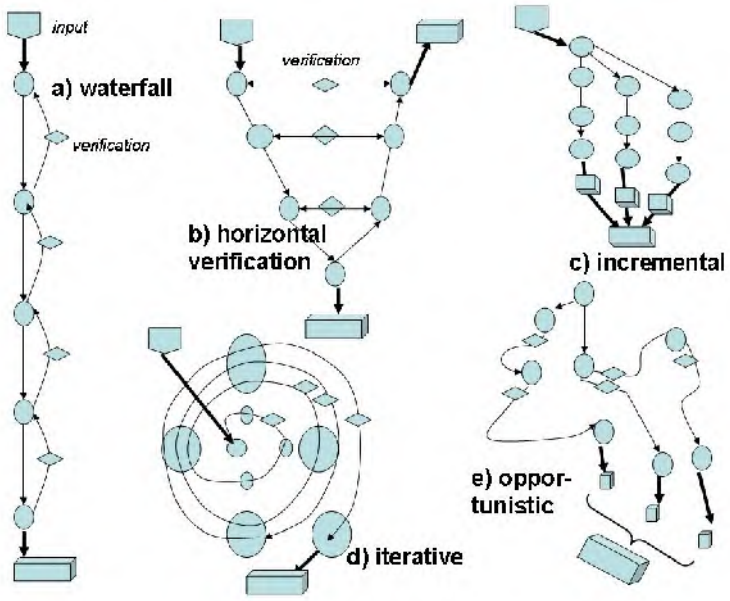


Fig. 5: Development Strategies

3 Enactment of Process Models

Initial attempts to support process models by a process interpreter go back to 1980 [Huenke-80]. An approach to guarantee (and if necessary enforce) adherence to the process model can be achieved by using a

formalized and machine readable process model which is on-line and can be interpreted ("enacted") by a computer program, usually called "Process Engine" or "Model Interpreter" [Chroust-10v, Kuhrmann-10w]. Today numerous additional services have been added, including recording the status of work products, semantically checking the correct relationship between different work products. We speak of (Integrated) Software Engineering Environment (SEE) [Schaefer-95].

4 Human Aspects of Process Models

Software development is largely a human, personnel-intensive activity, based on human intelligence and engineering ability, by necessity usually performed in teams. It is therefore imbedded into a social and organizational contexts. People and culture determine the use of a system and are also a main cause of failures, both in the development and use of systems.

The Individual Developer : With respect to the personality of an individual developer several issues have to be considered when introducing a process model [Chroust-08j]. Reasons for objecting a process model are often unjustified fear of loss of self-fulfilment and self-respect, loss of flexibility, loss of creativity (see below), changes in status and group relationship, problems with method, paradigm, and tools, encroaching management, organizational overkill, and cultural differences (see below).

Cultural Differences : The importance and pervasiveness of international cooperation and outsourcing of (parts of) projects is growing globally. Cultural differences [Hampden-00, Hofstede-05] therefore gain increased importance [Chroust-08b, Krishna-04]. Of special importance is the attitude towards a formal hierarchy (see 'Power Distance Index' [Hofstede-05]) differences between high context and low context cultures [Hall-76].

Creativity : The issue of (the loss of) creativity is multi-faceted and linked to the question on which levels how much creativity is helpful or counter-productive for the development process [Chroust-08b, Chroust-08j, Mittermeir-95]. Basically one can say that with progress towards the implementation level, less creativity is needed in favor of a more uniform, transparent process.

5 Quality of Development Processes

Many different approaches exist to improve, to guarantee, to assist, or at least to check ex-post the quality, especially the correctness, of an industrial product. Most of the classical approaches of industry (e.g. proof of correctness), however, are not effective, efficient, and feasible for systems engineering.

Industrial experience [Humphrey-89] shows that following a well-defined and proven development process is one of the keys to successful, high quality software products. This has led to methods of measuring the capability of a organization's development processes (ISO9000, CMM, CMMI [Chrissis-06], ISO15504 (SPICE) [ISO15504-1-04], etc.)

6 Summary

The paper identifies a wide range of still existing challenges in (Software) Systems Engineering. Promising approaches are defining of Process Models, computer supported Enactment of these process models and the measurement of process capability. Human aspects, unfortunately, receive too little attention.

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The overarching theme of the Sixteenth IFSR Conversation 2012, held in St. Magdalena, Linz, Austria, in April 2012, was to reposition systems thinking in a changing world both with respect to scientific research and practical applications, in view of historical roots and the precarious situation of our environment.
The conversation was conducted in the traditional form that had been established in 1980, relying on face-to-face discussions without the presentation of conference papers..
The externally visible outcome is a proceedings volume *(Chroust, G. , and Metcalf, G. (eds.) (2102) Systems and Science at Crossroads - Sixteenth IFSR Conversation, Inst. f. Systems Engineering and Automation, Johannes Kepler University Linz, Austria, SEA-SR-32, Sept. 2012 and [http://ifsr.ocg.at/world/files/$12m$Magdalena-2012-proc.pdf]).*

Additionally a conversation often produces auxiliary material which is too voluminous and/or too specialized to go into the proceedings (e.g. a day by day log of activities, intermediate hand drawn charts). Some of this material was collected in this volume as a special supplement to the proceedings. In most cases it is not very meaningful for outsiders but might serve as base material for further Conversations.

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