INFORMATION SYSTEMS

27/04/15

CREATIVE DESTRUCTION

"Build a better mousetrap and the world will beat a path to your door."

Faults:

Market Awareness: If nobody knows you exist and have built a mousetrap, no one will know that there is a path worth beating

Actual needs: If people do not have a mice problem, they do not need mousetrap

Perceived Needs: People who have mice, but are not aware of their existence, will not be interested in mousetrap. Likewise people who think mice are "the cutest things" are not good prospects

Definition of Better: Will buy only if agree it is better. Someone who is Style conscious may consider a mousetrap that is 10% more efficient at catching mice but 20% less attractive, to be inferior.

The Effort of Beating the path: Even if customers have real need, perceive their existence, and recognise your product as better, still may not beat a path to your door if product is not superior or worth it, they won't bother.

Implications

Many companies left wondering: "We have a great product, why isn't the world beating a path to our door?"

Value In The Customers' Terms: value means different things to different people Should you provide it's technical specs or show that it is it easy to use? Important to address all parties' concerns. Can't keep everyone happy

Delivering the Message: must communicate these benefits

Making Latent Needs Real: What if your product is needed but market participant do not perceive them? You must educate prospects about problem before you can sell them your product

Beating The Path: Must make it easy for customer to buy your product. 50% of something always beats 100% of nothing

Summary

- All other things equal - a product that offers equal value in the customer's eyes will win if you can better communicate its value
- A product that is better in the customer's eyes will win even if it is

inferior in the product engineers eyes

- The easier you make it for your customer to buy your product, the more likely they will

Clayton Christian : The Innovator's Dilemma

- Disruptive innovation key to achieving growth in fast changing world
- Industry giants focus on sustaining innovation and upgrading existing products, but by doing so are ignoring the regular customers and focusing only on the high paying ones
- The disruptive innovator takes a different approach and offers simple, low-cost alternatives that focus on exactly customers is looking for.
- Disruptive innovation create new markets and reshape existing ones successfully serving competitive objects

- Innovator's dilemma comes from the idea that orgs will reject innovative based on the fact that customers cannot currently use them, thus allowing their idea with great potential to go to waste

Schumpeter

- Also known as Schumpeter's gale creative destruction describes the process of industrial mutation that incessantly revolutionises the economic structure from within, incessantly destroying the old one, incessantly creating a new one
- Refers more broadly to the linked process of the accumulation and annihilation of wealth under capitalism
- Capitalism is by nature a form or method of economic change and not only never is but never can be stationary
- The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new method of production, new markets that capitalist enterprise creates

- Process of creative destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has got to live in
- ICE EXAMPLE

- Dynamic process inherent in a free (i.e. competitive) market
- Innovation the main driver of wealth
- Technology the enabler
- Technology the deliverer
- Evolutionary
- Incentives

INFORMATION SYSTEMS 3.

CREATIVE DESTRUCTION

- New isn't always better
- Entrepreneurship isn't always innovation
- Innovation in time will be mechanized
- The entrepreneur will be eradicated
- Capitalism will begin decline

Business Cycles

- The entrepreneur disturbs the equilibrium and is the prime cause of economic development which proceeds in cyclic fashion along several time scales
- Suggested a model in which the 4 main cycles Kondratieve (54), Kuznets (18) Juglar (9) and Kitchin (4) can be added together to form a complex waveform
- The answer is creative destruction

THE 6th K-WAVE

- In economics known as super cycles 40-60 years

Steam → brain → oil → car → chips → robot

golf.

Time

Industrial use, aerospace - cars and wood furniture

There is Destructive Destruction

- Monopolies and oligopolies → Traditional macro economic model and Strategies based on "perfect/pure" competition
  ⇒ Sustain market leadership by
  - cut costs the cat
  - undercut competitor
  - Absorb them
  - Incapacitate them
  - Sue them
  - Threaten them.
- Usually strong advocate of the free market?
- Boom and bust seen as the norm → a sign of a stagnant economy

Disruptive Technologies

- e cigarettes 15% of tobacco industry
- Genomics and personalized medicine
- Energy extraction methods
- Liquified gas / air?
- LED's
- Re-insurance

- Digital and cyberwarfare
- Software defined networking
- 3D printing
- Big Data
- Saas
- Advanced automation
- Over the top content - online media - goodbye RTE?

Social Media and creative Destruction
- Communication - less emails / letters
- Sharing of pictures in real time
- Advertising
- Job recruitment
- Social Activism
- Myspace / Bebo gone
- Continually being updated to keep up with pace, developments etc.

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CREATIVE DESTRUCTION

Creative Destruction: Schumpter "process of industrial mutation that incessantly revolutionise the economic structure from within, incessantly destroying the old one, increasingly creating a new one"

Example: Cassette replaced by 8-track, replaced by compact disk, replaced by MP3 which in turn will be replaced by new technology

Schumpter: "process of creative destruction is the essential fact about capitalism"

Social media and creative innovation:
- Communication, less emails, letters
- Sharing of media - pictures in real time
- Advertising
- Job recruitment
- Social Activism
- myspace, bebo gone
- Continually being updated to keep up with pace, destroying itself

Disruptive Technologies:
- eCigarettes
- Genomics and personalised genetic medicine
- Energy extraction methods
- LEDs
- Digital and Cryptocurrencies
- Software defined networking - eradicated legacy system
- 3D printing - fake teeth etc, job loss
- Big Data
- Over the top content - online media - tv
- Advanced automation

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Creative Destruction - build something which will inevitably be destroyed

Clayton Christenson - innovators dilemma (creative destruction)

Big companies keep adding bells and whistles, new company will undercut with simpler product cheaper

Schumpeterian gale - creative hurricane in economics

Nothing stays still, always moving

Marx ⇒ capitalism from one crisis to another

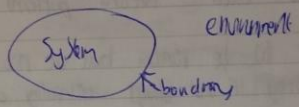
INFORMATION SYSTEMS

26/04/15 GENERAL SYSTEMS THEORY

Butterfly effect - the loop within loop - amplified response

- A model of set of interrelated principles and concepts that explains or argues/aims complex events
- Every part within org relates to each other.
- Generic and can be applied to many different fields

History of GST
- Over time, System theorist were trying to develop a theory that explains systems across all fields
- 1936 Ludwig von Bertalanffy developed GST to solve this problem
- Theory developed further by Ross Ashby in 1956



- Bertalanffy expressed that real systems are exposed to, and work together with, their environment and can obtain qualitatively new properties through development resulting in constant development.
- The same concepts and principles of org underlie different disciplines (sociology, town etc) providing a basis for unification
- Systems concepts include:
  - System - environment boundary
  - Input
  - Output
  - Process
  - State
  - Hierarchy
  - Goal direction
  - Information

- System theory concentrated on structure
- Cybernetics concentrated on relationships
- Both sides of the same coin

- Chaos theory is a field of study in maths. CT studies the behaviour of dynamical systems that are highly sensitive to initial conditions an effect which is popularly referred to as the butterfly effect.

- Small differences in initial conditions (such as rounding errors) yield widely diverging outcomes for such dynamical systems, rendering long term prediction impossible in general

- This happens even though these systems are deterministic, meaning that their future behaviour is fully determined by their initial conditions, with no random elements involved.

- In other words, the deterministic nature of these systems does not make them predictable. This behaviour is known as deterministic chaos or simply chaos

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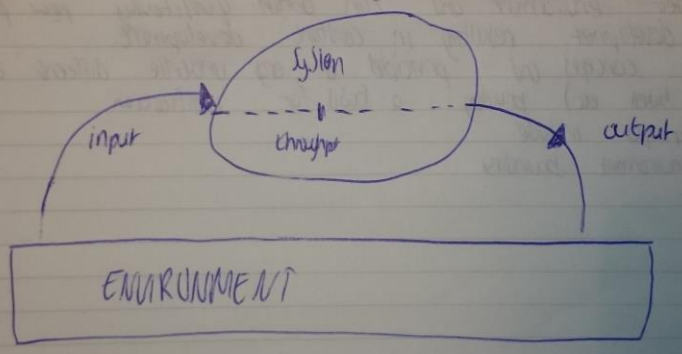
- Chaos theory contends that complex and unpredictable results occur in systems that are sensitive to small changes in their initial conditions

- Butterfly effect - States that the flapping of a butterfly's wings in the amazon could cause tiny atmospheric changes which over a certain time period could effect weather patterns in new york ⇒ known as chaotic systems

- Appear to be random but are not. Beneath random behaviour patterns emerge, suggesting, if not always revealing, order.



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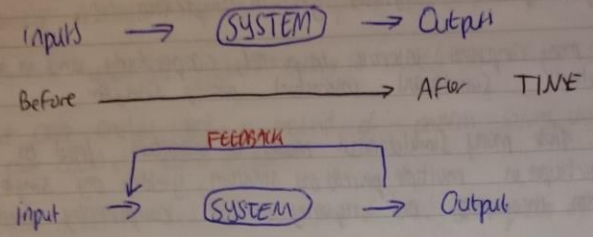
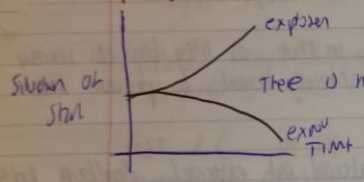
26/04/15. FEEDBACK

FEEDBACK



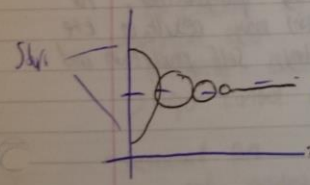
POSITIVE FEEDBACK



Exponential growth and drive behaviour
⇒ Amplification

Fruit ripening.

NEGATIVE FEEDBACK



Water level or Speeding Temperature

Maintenance of equilibrium and convergence

Homeostasis: property of a system in which variables are regulated so that internal conditions remain stable and relatively constant.
(homeostasis a stable internal environment)

Teleonomy - quality of apparent purposefulness and of goal directedness of structures and functions in living organisms that derive from evolutionary history, from adaptation or generally from the operation of a program.

CAUSALITY - Relationship between cause and effect / Principle that everything has a cause

ATTRIBUTES OF GENERAL SYSTEMS THEORY AND CYBERNETICS

Complexity: Cybernetic Systems are complex structures, with many heterogeneous interacting components. Systems grow in complexity.

Mutuality: There many components interact in parallel, cooperatively, and in real time, creating multiple simultaneous interactions among subsystems.

Complementarity: There many simultaneous modes of interaction lead to subsystems which participate in multiple processes and structures, yielding any single dimension of description incomplete, and requiring multiple complementary irreducible forms of analysis.

Evolvability: Cybernetic systems tend to ~~evolve~~ evolve and grow in an opportunistic manner, rather than be designed and planned in an optimal manner.

Constructivity: Cybernetic systems are constructive, in that as they tend to increase in size and complexity, they become historically bound to previous steps while simultaneously developing new traits.

Reflexivity: Cybernetic systems are rich in internal and external feedback, both positive and negative. Ultimately they can enter into the "ultimate" feedback of reflexive self-application, in which their components are operated on simultaneously from complementary perspectives, for example as entities and processes. Such situations may result in the reflexive phenomena of self-reference, self-modelling, self production and self-reproduction.

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GST and work

Knowledge Management - process of capturing, developing, sharing and effectively using organisation

Networking - valuable and productive activity for owner/manager - links like minded people

Root cause analysis - RCA - a method of problem solving used for identifying the root causes of faults or problems

Workflow sometimes described as a series of tasks that produce an outcome

Agile programming - approach to project managing typically used in software development. Helps team react to instability of building software through incremental, iterative work cycles known as sprints

Mechatronics - multidisciplinary field of engineering that include a combination of mechanical engineering, electrical eng, telecoms eng, comp and computer eng

GST & IC In the World

- Environmental deterioration - self explanatory

- Population (Malthus) - Malthusian catastrophe - sooner or later population will be checked by famine and disease.
  → Argues that population multiplies geometrically and food linearly, population will eventually outstrip food supply
  → Urges control on population growth

- Generated size - creates not only a danger to life that to be combated and neutralised by adaptive mechanisms, it also creates higher life

- Information overload - difficulty in making decisions because of too much information
  - Amount of input to a system exceeds its processing capacity

- Fragmentation of knowledge: carved up universe into smaller pieces until they reached such a fine level of subdivision that they could no longer observe the piece clearly.

- Erosion of value systems

- World view - rooted in rationality and this old dream of a kind of universal values
  - learn of world in terms of relationships and integration

Where is GST RC now?

Systems engineering evolved as it getting increasingly involved in projects organized under the assumption that may improve the manifestation of human activity related with the development of the culture and present of the

In recent years an increasing deterioration of the way humanity is still functioning has become the main challenge for the systems community

Deterioration of human society under trade, poverty, intolerance ...

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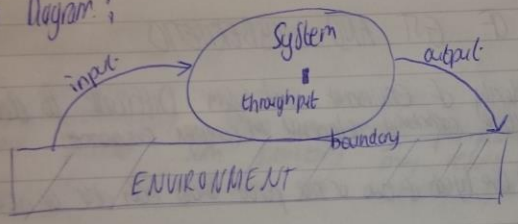
GENERAL SYSTEMS THEORY

WHAT IS GENERAL SYSTEMS THEORY?
One of the several methodologies (such as operations research, system approach, system analysis) which employ systems approach to understanding of complex phenomenon and problems. GST focuses on the systems structure instead of a system's function

It proposes that complex systems share some basic organising principles irrespective of their purpose, and that these principles can be modelled mathematically. Introduced by Ludwig von Bertalanffy in 1951

Basic ideas:
- Treat inter-related phenomena as a system
- Study the relationship between the parts and the system as a whole
- Don't worry if we don't fully understand each part

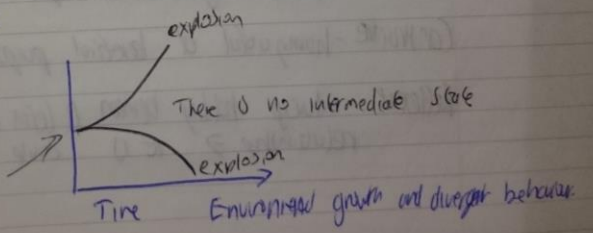
System Diagram:



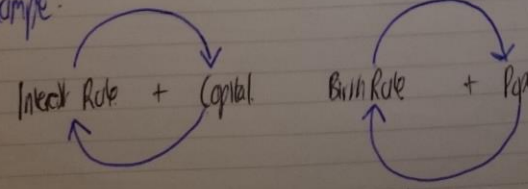
TWO TYPES OF FEEDBACK

Positive and negative feedback

Positive feedback → bad

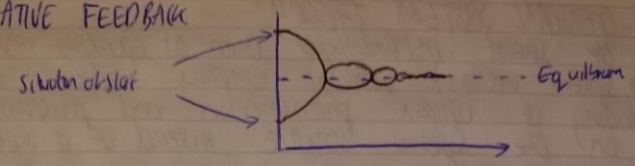


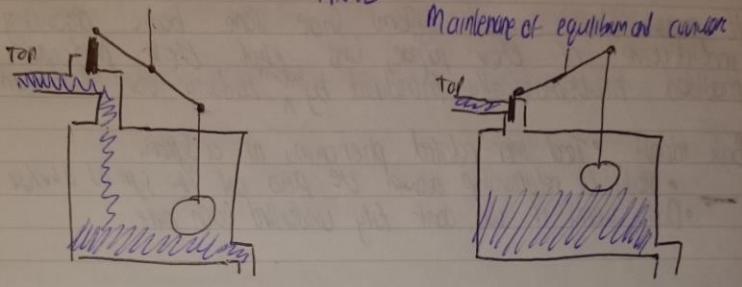
Example:



There are effects to other, no equilibrium

NEGATIVE FEEDBACK





6 ELEMENTS OF GST AND CYBERNETICS

Complexity ⇒ Complexity of environment and system. Difficult to determine cause and effect.
- Multiple contributing elements in complex environment

Mutual - experience or observation of two or more parties towards each other or others

Complementary - combining in such ways as to enhance the qualities of each other or another

Evolvable - capacity of system to adapt for adaptive evolution

Constructive - having useful or beneficial purpose

Reflexive - always holding between a term and itself — refers to a circular relationship ⇒ it is cause and effect

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9/04/15 ATTRIBUTES OF GST AND CYBERNETICS

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