

Socio-Technical Systems (Presented as environments of the business organization)

Component	Description	Examples	Frameworks	Frameworks
<b>Technological</b>	<p><i>Hardware: machines of different kinds</i>  <i>Software: Code that configures machines around human purposes</i></p> <p><i>Technology can constrain business activity in the long run by de-skilling individuals</i></p> <p><i>Technology, especially online software, can instrument human action:</i></p> <ul style="list-style-type: none"> <li>• communication, surveillance, data mining</li> </ul>	<p>Door (with tasks delegated to it such as automatically shutting and being locked)                      Microsoft Office, Firefox Browser, Social Networking Software (Facebook)</p> <p>Cogeneration Technology (criteria used in refusing Cogentrix project)</p> <p>Power-Generating Technologies (based on renewable vs. non-renewable resources)</p> <p>Automobiles, computers, cell phones all of which have produced profound changes in our STSs</p>	<p>Value Realization</p> <ul style="list-style-type: none"> <li>• <b>Discovery</b> <ul style="list-style-type: none"> <li>• project definition</li> <li>• specifying design features</li> <li>• designer values</li> <li>• user values</li> </ul> </li> <li>• <b>Translation</b> <ul style="list-style-type: none"> <li>○ Operatinalization</li> <li>○ Implementation</li> </ul> </li> <li>• <b>Verification</b> <ul style="list-style-type: none"> <li>○ Interviews (individual and focus group)</li> <li>○ DILS</li> <li>○ Surveys</li> </ul> </li> </ul> <p><b>Transperspectivity</b></p> <ul style="list-style-type: none"> <li>• Discovering strands of construction of current STS</li> <li>• Identifying possibilities for reconstruction</li> </ul>	<p><b>Social Constructionism</b></p> <ul style="list-style-type: none"> <li>• Interpretive Flexibility</li> <li>• Rhetorical closure of IF</li> <li>• Black Box</li> </ul> <p><b>Technological Determinism</b></p> <ul style="list-style-type: none"> <li>• Complexity in the form of tightly coupled systems and non-linear causality</li> <li>• Technological Imperative: need to maintain complex authoritarian technological systems</li> <li>• Reverse Adaptation: Humans adapt themselves to ends of technology rather than vice versa</li> <li>• Centrality of control (e.g., horizontal vs. vertical mgt)</li> </ul>
<b>Ethical and Social</b>	<p><i>Moral Constructs</i></p> <ul style="list-style-type: none"> <li>• <i>Spheres of justice where distribution takes place according to context-dependent rules (Walzer)</i></li> </ul> <p><i>Social Constructs:</i></p> <ul style="list-style-type: none"> <li>• <i>Power (and its distribution among groups and individuals)</i></li> </ul>	<p>Basic Moral Concepts: rights, duties, goods, values, virtues, responsibility; justice</p> <p>Intermediate Moral Concepts: Privacy, Property, Informed Consent, Conflict of Interest, Free Speech, Due Process, Safety/Risk</p>	<p>Theoretical approaches:</p> <ul style="list-style-type: none"> <li>• <b>Utilitarian:</b> Happiness is tied to maximizing the satisfaction of aggregated preferences</li> <li>• <b>Rights:</b> Capacities of action that are essential to autonomy, vulnerable to standard threats, and impose feasible correlative duties</li> <li>• <b>Virtues:</b> settled dispositions toward the mean between extremes of excess and defect (courage between cowardice and recklessness)</li> </ul>	<p><b>Basic Capabilities:</b></p> <ul style="list-style-type: none"> <li>• life, bodily health, bodily integrity</li> </ul> <p><b>Cognitive Capabilities</b></p> <ul style="list-style-type: none"> <li>• sense, imagination, thought</li> <li>• emotion</li> <li>• practical reason</li> </ul> <p><b>Social Capabilities</b></p> <ul style="list-style-type: none"> <li>• Affiliations</li> <li>• Other Species</li> </ul> <p><b>Capabilities that address vulnerabilities</b></p> <ul style="list-style-type: none"> <li>• Play</li> <li>• Control over environment</li> </ul>

<b>Physical</b>	<i>Physical environment imposes constraints (limits) over actions that restrict possibilities and shape implementation.</i>	Influence of rivers, mountains, and valleys on social and economic activities such as travel, trade, economic and agricultural activity, commerce, industry, and manufacturing	Classroom environment enables or constrains different teaching styles (Difficulty of holding small group discussions in 236)	Physical arrangement of objects in classroom as well as borders of classroom can channel toward centralized or decentralized learning and evaluation strategies
<b>Stakeholders</b>	<i>Any group or individual that has a vital interest in play (at stake) in the situation.</i>	<b>Market Stakeholders</b> <ul style="list-style-type: none"> <li>• employees</li> <li>• stockholders</li> <li>• customers</li> <li>• suppliers</li> <li>• retailers/wholesalers</li> <li>• creditors</li> </ul> (Distinction used by Lawrence and Weber in Business and Society)	<b>Non-Market Stakeholders</b> <ul style="list-style-type: none"> <li>• communities</li> <li>• activities groups and NGOs</li> <li>• business support groups</li> <li>• governments</li> <li>• general public (those impacted by projects without participating in their development)</li> </ul>	<b>Role</b> —The place or station a stakeholder occupies in a given organizational system and associated tasks or responsibilities <b>Interests</b> —Goods, values, rights, interests, and preferences at play in the situation which the stakeholder will act to protect or promote <b>Relation</b> —Each stakeholder is related to other stakeholders in an alliance and each relation is tied to goods and values
<b>Procedural</b>	<i>A series of interrelated actions carried out in a particular sequence to bring about a desired result, such as the realization of a value. Procedures can schematize value</i>	Hiring a new employee <ul style="list-style-type: none"> <li>• job description</li> <li>• soliciting and reviewing applications</li> <li>• interviewing candidates</li> <li>• final selection</li> <li>• tendering a job offer</li> </ul> Forming a corporation Filing for bankruptcy Gaining consent to transfer TGI and PII to a third party (opt in or opt out)	Value Realization Process in Software Engineering <ul style="list-style-type: none"> <li>• Discovery—Uncovering values shared by a given community</li> <li>• Translation—operationalizing and implementing values in STS</li> <li>• Verification—using methods of participatory observation to validate that values in question have been discovered and translated</li> </ul>	Challenging the UPRM ADEM Statement of Values <ul style="list-style-type: none"> <li>• Stakeholder group raises conceptual, translation, range or development issues</li> <li>• Group outlines possible responses to challenges</li> <li>• Group presents their challenge and response to other stakeholders</li> </ul>

<p><b>Legal</b></p>	<p><i>Laws differ from ethical principles and concepts in that laws prescribe the minimally moral; ethical principles and concepts explore higher moral “spaces”</i></p> <p><i>Ethical principles challenge and criticize laws by bringing into question their normative content</i></p> <p><i>Laws can challenge ethical principles and concepts by raising issues of practicality</i></p>	<p><b>Criminal Law</b></p> <ul style="list-style-type: none"> <li>• Applies to individuals</li> <li>• Interested party in a criminal trial is society, not the victim</li> <li>• Involves proving a mens rea and actus reus or a guilty, law-breaking action</li> <li>• Involves showing that the mens rea caused the actus reus</li> </ul> <p>Criminal law does not apply to corporations because they have “no soul to damn or body to kick” Baron Thurlow</p>	<p><b>Civil Law</b></p> <ul style="list-style-type: none"> <li>• Torts concern wrongful injury. Objective of a tort is to make the victim “whole” after an injury.</li> <li>• To prevail in a tort one must prove (in order of severity) negligence, recklessness, or intent.</li> <li>• Negligence involves proving that the defendant failed to meet some standard of due care</li> <li>• Contract law concerns the violation of the terms of a contract</li> </ul>	<ul style="list-style-type: none"> <li>• US and British law work through a common law system. where current decisions are based on precedent.</li> <li>• The Puerto Rican system is based on the Napoleonic code where decisions relate directly to existing law and statute</li> <li>• Question: How does the statute-based Napoleonic system in PR constrain and enable business practice in relation to other systems such as the British and American common law system?</li> </ul>
<p><b>Market</b></p>	<p><i>Business takes place within different markets that shape supply, demand, and price. Globalization, frequently, requires that a business be adept at operating across different markets.</i></p> <p>(Liberal use made here of notes from Economics class)</p>	<p><b>Markets:</b></p> <ul style="list-style-type: none"> <li>• <i>Laissez Faire:</i> Each economic unit makes choice based on rational (enlightened) self-interest. (Private Ownership of Goods)</li> <li>• <i>Liberal Democratic Socialism:</i> Limited government intervention is needed to improve upon the choice of individual economic units. (Mixture of private and public ownership)</li> </ul>	<p><b>Assumptions of a Free Market System</b></p> <ul style="list-style-type: none"> <li>• Individual decisions are aggregated</li> <li>• Information flows through price structure</li> <li>• Free association</li> <li>• absence of force or fraud</li> <li>• individual agents are rational utility maximizers</li> <li>• governments should adopt a hands-off stance because interference disrupts the ability of markets to produce</li> </ul>	<p>Recent economic studies of limits of laissez faire markets</p> <ul style="list-style-type: none"> <li>• Information asymmetries (studied by Stiegliz)</li> <li>• Monopolies who, in the absence of competition, can dictate price</li> <li>• Animal spirits which deflect economic decision-making away from perfect utility maximizing <ul style="list-style-type: none"> <li>○ confidence</li> <li>○ fairness</li> <li>○ corruption</li> </ul> </li> </ul>

	<p>taught by CR Winegardner, University of Toledo, 1971-2)</p>	<ul style="list-style-type: none"> <li>• <i>Communist, Authoritarian Socialism</i>: The state is in the best position to know what choices and policies are beneficial for the economy as a whole and its component parts. (Public ownership of goods and services)</li> </ul>	<p>utility maximizing conditions</p> <ul style="list-style-type: none"> <li>• (From Natural Capitalism)</li> </ul>	<ul style="list-style-type: none"> <li>○ money illusion</li> <li>○ stories</li> <li>• Ghoshal: bad management theories are destroying good management practices</li> </ul>
<b>Informational</b>	<p><i>How data and information is collected, stored, and transmitted along with ethical issues such as informed consent and privacy that accompany information management</i></p>	<p><b>Informed Consent:</b></p> <ul style="list-style-type: none"> <li>• Obtaining consent from information holder when collecting, storing, and transferring PII and TGI</li> </ul> <p><b>Belmont Report</b></p> <ul style="list-style-type: none"> <li>• <i>Principles</i>: Respect for Persons, beneficence, and justice</li> <li>• <i>Application1</i>—Informed Consent: “subjects to the degree that they are capable be given the opportunity to choose what shall or shall not happen to them”</li> <li>• <i>Application2</i>—Assessment of risks and benefits</li> <li>• <i>Application3</i>—Selection of Subjects for experiment</li> </ul> <p><b>Conditions of Informed Consent</b></p> <ul style="list-style-type: none"> <li>• Information</li> <li>• Comprehension</li> <li>• Voluntariness</li> </ul>	<p>Privacy in Context</p> <p>Identify individuals and groups in a context</p> <p>Identify the roles played by these individuals and groups</p> <p>Identify context-relative norms that guide activities within context and between one context and another</p> <p>Helen Nissebaum, Privacy in Context</p>	<p>Data Transfer and Informed Consent</p> <ul style="list-style-type: none"> <li>• Opt-in. Information is not transferred unless data-holder expressly consents</li> <li>• Opt-out. Data will be transferred unless holder expressly refuses or withdraws consent</li> </ul> <p>Fair Information Practices</p> <ul style="list-style-type: none"> <li>• Notice—full disclosure and redress (way to resolve problems)</li> <li>• Choice—Choice about how information is to be used</li> <li>• Access—access to stored and about to be disclosed information</li> <li>• security—ways that information will be kept secure and unauthorized access prevented in collection, storage, and transfer of information</li> </ul>
<b>Natural</b>	<p>Wicked Problems</p> <ul style="list-style-type: none"> <li>• problems of problem formulation</li> </ul>	<p>Principles of sustainability according to B Norton</p>	<p>Shadow Markets to determine environmental value.</p> <p>(Many environmental economists advocate using the market concept</p>	

	<ul style="list-style-type: none"> <li>• Non-compatibility of solutions (several ways of stating conclusions)</li> <li>• wicked problems involve “competing values” that can’t be homogenized</li> <li>• wicked problems are “non-repeatable” that is they are context dependent. This renders learning from the past much more difficult</li> <li>• wicked problems exhibit “open-ended inter-temporal effects”</li> </ul> <p><b>Closely paraphrased from Norton, Sustainability, 133-135.</b></p>	<p><b>Precautionary Principle</b>  “in situations of high risk and high uncertainty, always choose the lowest risk option” (In his book, Cass Sunstein distinguishes several senses of the PP including one which essentially makes it impossible to deviate from the status quo.) (Norton 348)</p> <p><b>Safe Minimum Standard</b>  “save the resource, provided the costs of doing so are bearable” (Norton 346)</p>	<p>to determine how we should allocate and use natural resources. This gives rise to two very different procedures discussed in detail by Mark Sagoff.)</p> <p><b>Willingness-to-pay</b></p> <ul style="list-style-type: none"> <li>• Bidding market on El Yunque. Disney bids on converting it into an amusement park. Walmart bids on using it as a store site with parking lot. An environmental action group wants it preserved as a tropical forest. Resource would go to the highest bidder in this shadow market. The bid itself is a product of the disposable income.</li> <li>• WTP = how much is an interest group wtp to “capture” a given resource for their own particular use.</li> </ul> <p><b>Willingness-to-sell</b></p> <ul style="list-style-type: none"> <li>• Resource is owned by the public so its value is determined by its selling rather than buying price</li> <li>• Frees bid from disposable income. Now value becomes more reflective of the identity-conferring beliefs and attitudes of a community and its members.</li> </ul>
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## About Socio-Technical Systems

1. Socio-Technical Systems provide a tool to uncover the different environments in which business activity takes place and to articulate how these constrain and enable different business practices.
2. A STS can be divided into different components such as hardware, software, physical surroundings, stakeholders, procedures, laws, and information systems.
3. But, while different components can be distinguished these are, in the final analysis, inseparable. STSs are first and foremost systems composed of interrelated and interacting parts.
4. STSs also embody values such as moral values (justice, responsibility, respect, trust, and integrity) and non-moral values such as efficiency, satisfaction, productivity, effectiveness, and profitability. Often these values can be located in one or more of the systems components. Often these values conflict with one another causing the system to change.
5. STSs change and this change traces out a path or trajectory. The normative challenge of STS analysis is to find the trajectory of STS change and work to make it as value realizing as possible.