

SWI Notes

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1 Essence Terminology

Term	Definition
<i>Digital innovation</i>	Products, services processes, or business models that emerge within or between business units and where digital technology is a key factor in triggering or enabling value.
<i>Paradigm innovation</i>	Products, services, processes, or business models that emerge from radical changes in the mental models of what a business is; who the users are; or what the market is.
<i>Position innovation</i>	Products, services, processes, or business models that emerge by fitting earlier solutions into new uses.
<i>Process innovation</i>	New or radically improved ways to produce products or services.
<i>Product innovation</i>	New or radically changed products or services.
<i>Software-intensive system</i>	Systems where software plays a key role in providing functionality and value. A software-intensive system is a system where software is essential for the design, construction, or implementation of the system as a whole.
<i>Appreciative system</i>	The set of values, preferences, and norms, in terms of which they make sense of practice situations, formulate goals and directions for action, and determine what constitutes professional conduct.
<i>Apprehension</i>	Understandings - leaps of faith - without factual grounds for asserting its existence. When we apprehend, we understand an idea or notion without factual basis for its existence.
<i>Assertion</i>	Beliefs or facts backed by evidence.
<i>Backing</i>	Why the Prospect is an attractive and useful solution to the Problem.
<i>Capability</i>	An ability or facility devised to handle Manifestations as part of a Solution that Provides Value. <i>Basically, what we call a feature normally.</i>
<i>Contribution</i>	Column in the Configuration Table. What we design as part of a solution. Used to understand and devise how the constructive parts of a solution could be designed.
<i>Criteria</i>	What to look for to determine if desired qualities are achieved.
<i>Inner Environment</i>	The substance and organization of what we design and implement.
<i>Outer Environment</i>	The surroundings in which our problem resides and where the contributions we design will operate. External services, implements, repositories, and people are examples of elements in the Outer Environment.
<i>Inquiry</i>	Inquiry is a reflective thoughts process of understanding and resolving a problem. This starts the moment we recognize an Indeterminate Situation as problematic.
<i>Keystones</i>	What we used to build the Solution - technologies, components, information, and human resources are examples of keystones.

<i>Leverage</i>	Keystones of the Inner Environment that help create a great Contribution .
<i>Manifestation</i>	An object, event, or action that reflects or gives a tangible or visible form to the Problem. Such objects, events, or actions, in turn, should be matched by Capability provided by the Contribution of the project.
<i>Problem</i>	A Problem reflects an understanding of a situation. In Essence, Problems are used as analytical instruments. They are formulated as part of inquiring into a Problematic Situation . Problems, therefore, have no objective status.
<i>Prospect</i>	Our overall End-in-view . What we believe would be a solution if the products developed in the project are put to proper use. A Prospect thereby reflects an understanding of the problem and an adequate way to solve it.
<i>Qualification</i>	Do we solve the entire Problem or are there limitations in our resolution? Will our resolution be acceptable despite these limitations?
<i>Rationale</i>	Row in the Configuration Table. The logical basis that makes actions meaningful and helps reason about strategy and tactics.
<i>Reservation</i>	Limitations in the solution (why the Inner Environment might not support a complete solution to the Problem).
<i>Rebuttal</i>	Reasons why limitations in the solution may be acceptable.
<i>Resolution</i>	Why the Problem might be resolved by what is to be built, why this is important, and why the result is attractive. Resolution combines Prospect , Warrant and Backing .
<i>Situation</i>	Column in the Configuration Table. The problem and the context of it. An understanding that reflects an underlying mental model of the problem and the system ecology, who the users are, and what they care for.
<i>Solution</i>	Column in the Configuration Table. How our Contribution resolves the Situation . Solution is about the purpose and overall idea of the project.
<i>Strategy</i>	Row in the Configuration Table. The master plan for solving the overall problem: Including the scope of the problem, the key components for building the solution, and the qualifications regarding limitations and constraints that may affect the utility or acceptability of a solution.
<i>Tactics</i>	Row in the Configuration Table. Actions planned in accordance with a strategy to achieve specific ends.
<i>Valuation</i>	Column in the Configuration Table. Used to determine if we are moving in the right direction to resolve the Problem . Used to offer a range of ways to develop ideas, invent alternative lines of action, and, not least, provide criteria to assess and evaluate qualities of contributions to provide a sound basis for decision making.
<i>Value</i>	Something desired as a (partial) solution to the Problem .
<i>Warrant</i>	Reasons why solving the Problem is important.

<i>Constituent</i>	The distinctions and relations we experience when we see a problem.
<i>Element</i>	Core objects or events in the problem domain. Can be services, artifacts, repositories, individuals, groups, or events.
<i>Event</i>	Events are objects in time; especially things of importance for the unfolding of the problem and where one or more objects are involved.
<i>Existential</i>	Items can be existential (tangible) meaning that they have being in time and space or are experienced to be so.
<i>Ideational</i>	Items may be ideational - not yet in existence - and represent ideas for actions, things to build, or hypothetical concepts for example regarding user characteristics.
<i>Indeterminate Situation</i>	The condition before inquiry starts is called indeterminate. The elements of the situation are not determined - let alone understood - and the scope of inquiry is not presumed yet.
<i>Determinate Situation</i>	The determinate situation is the final outcome of inquiry where uncertainty and doubtfulness is resolved and replaced by a closed, finished, and unified situation.
<i>Object</i>	Transitory objects that can be represented - like any object - by nouns or substantives. Events have substance and are characterized by a delimiting beginning, an interval, and a termination.
<i>Problematic Situation</i>	A situation becomes problematic when our uncertainty and doubtfulness makes us stop and consider how to settle it. This is when we begin to consider which objects, events, and qualities seem relevant to the situation.
<i>Idea</i>	Ideas describe something that may happen. The development and evaluation of ideas are a central part of the progressive determination of a problem and ways to address it. For that reason, ideas may be vague when we start working on a not-too-familiar context and develop as we gain insights.
<i>Means</i>	Instruments used to attain an End - something that is useful in achieving a result. A database, a server, an app, etc., could be ends in and by themselves, but as we design and build them, they might also be means of building a system to serve a higher end.
<i>Material Means</i>	Means - including observed data, facts and artifacts - that combined serve to create a resolved situation.
<i>Procedural Means</i>	Procedural means serve to determine how and if a resolved situation is attained.
<i>Transaction</i>	Interactions between the inquirer and the materials at hand - the elements deemed part of the problematic situation and the means available for resolving it.
<i>End</i>	The ultimate end for inquiry is to resolve a problematic situation via existential changes. Such an end represents a fulfilling close and termination of the project.

<i>End-in-view</i>	An idea of an end to be reached and represents the purpose of taking a step towards an overall resolving end. The end-in-view is the anticipated consequence of taking a step - the existential change to be effected by that step.
<i>Approriate</i>	A Solution is appropriate to the Problem if there is a meaningful match between the two.
<i>Design By Contract</i>	An idea from software design. If stated preconditions are true, and if the software executes correctly, then the result will honor the stated postconditions. In Essence this idea is used to ensure that any activity in a project will leave the project in a stable state.
<i>ETVX Model</i>	A model of development activities consisting of four parts: Entry criteria, Task, Validation, and eXit Criteria.
<i>Pivot</i>	When one Prospect is replaced by another due to a significant change in project Rationale .
<i>RST Review</i>	There are three focus areas for reviews in Essence: Rationale , Strategy , and Tactics , and accordingly we use the term RST Reviews to denote Essence Reviews. The purpose of a RST Review is to determine if a Configuration Table needs to be revised.

2 General Innovation Theory

2.1 Basic Terms

- **Creativity:** a state of mind which leads to inventive or innovative thinking.
- **Invention:** e.g., a new algorithm, new use of data, or program.
- **Innovation:** creative act and invention carried into wider use, leading to substantial kinds of change. Innovation implies the successful use exploration of new ideas.

2.2 A combination of Activities

- **Innovation = invention + exploitation + diffusion.**
- **Invention:** The creative act or process and its result.
- **Exploitation:** Commercial development and adaptation to practical situations.
- **Diffusion:** Adoption by a wider audience.

2.3 Dimensions of Innovation

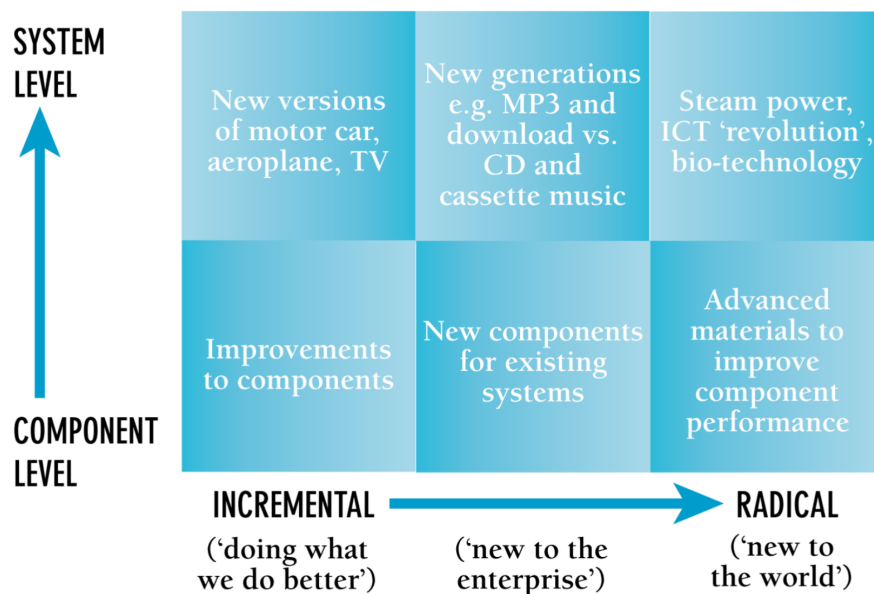


Figure 1: Tidd, J., Bessant, J. R., and Pavitt, K. 2005 Managing innovation: integrating technological, market and organization change. Wiley.

2.4 Innovation Space

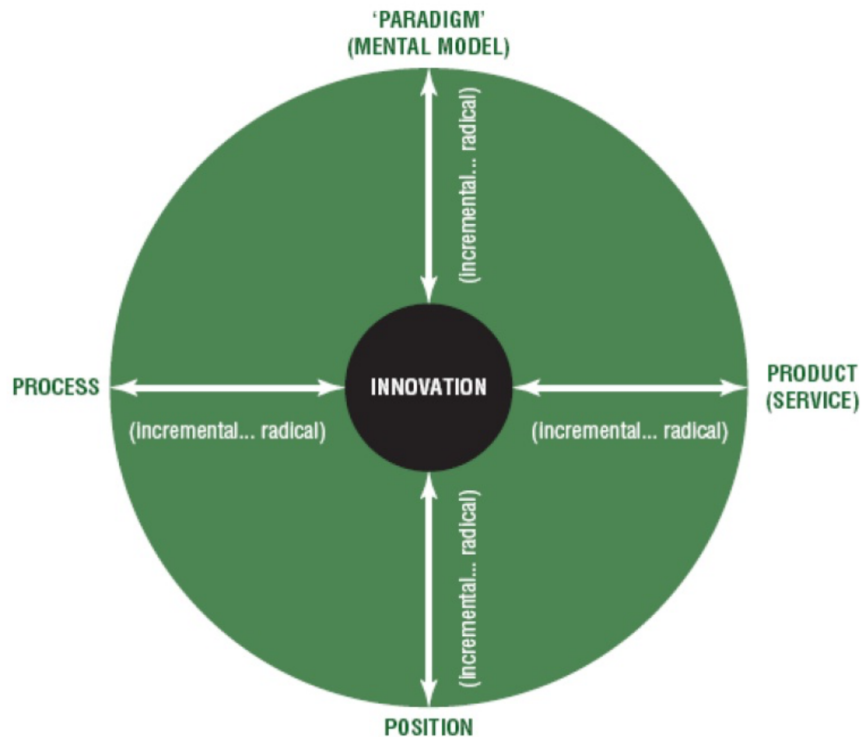


Figure 2: Tidd, J., Bessant, J. R., and Pavitt, K. 2005 Managing innovation: integrating technological, market and organization change. Wiley.

2.5 Novelty: Levels of Innovation (Altshuller)

- **Level 1:** Routine design problems solved by methods well known with the specialty - usually no invention needed.
- **Level 2:** Minor improvements to an existing system using methods known within the industry.
- **Level 3:** Fundamental improvement to an existing system using methods known outside the industry.
- **Level 4:** A new generation of a system that entails a new principle for performing the system's primary functions - solutions are found more often in science than technology.
- **Level 5:** A rare scientific discovery or pioneering invention of an essentially new system.

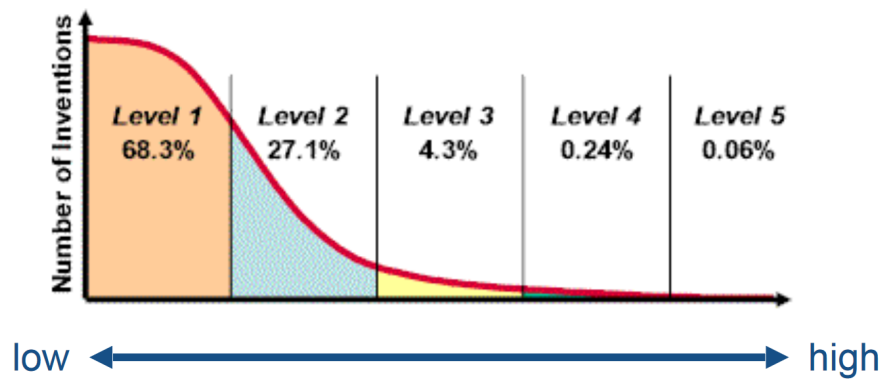


Figure 3: Jeremy Rose

2.6 Hierarchies of Technical Systems (Altshuller)

<div> broad ↑ ↓ focused </div>	system	subsystem
	transportation	cars , roads, maps, drivers, service stations
	cars	power train, brakes , heating, steering, electrical
	brakes	brake pedal, hydraulic cylinders, fluid, brake pad assembly
	brake pad assembly	pad , mounting plate, rivets
	pad	particles a, b, chemical bond
	chemical bond	molecules a, b

Figure 4: Jeremy Rose

2.7 Incremental and Radical Innovation

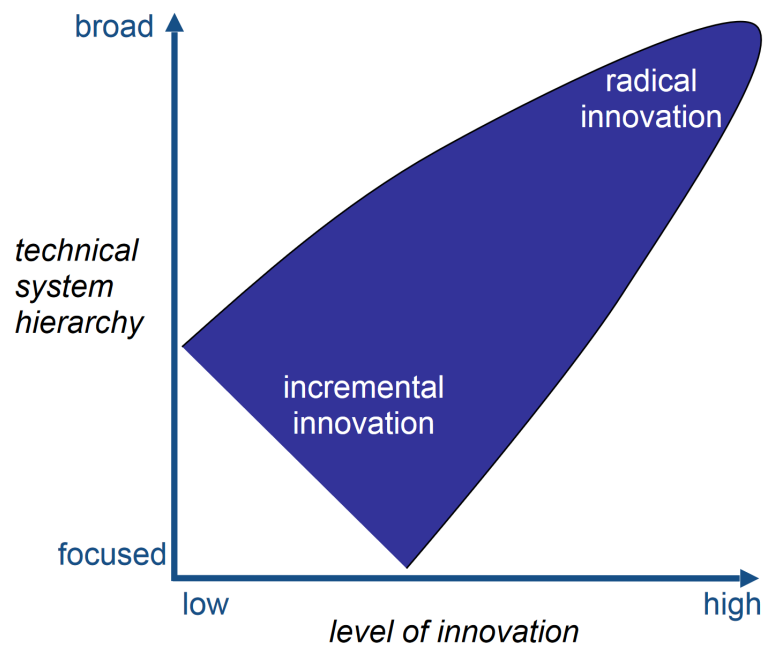


Figure 5: Jeremy Rose