A.11 Glossary[160]

A number of central concepts in the area of industrial innovation economics and intellectual property are explained below.

Adjustment lag: A time lag needed for one factor (variable) in a process to adjust to or be influenced by another.

Adopters: Actors finding an innovation factually (not only potentially) useful (see adoption), and therefore have decided to buy or use an innovation.

Adopters (early/late): Types of adopters in a population of adopters which make their adoption decisions early and late respectively in a diffusion process.

Adoption: An innovation found factually useful, not only potentially, to an actor (see adopters).

Affidavit: A written declaration or statement of facts confirmed by an oath or affirmation of the party making it.

Anti-commons problem: Problem with too many fragmented IPRs in a field.

Appeal: A review of the decision of an inferior court by a higher court. In European civil law tradition, the reviewing court may review all matters, both matters of fact and matters of law. In the Anglo-American civil law tradition, a court of review is generally limited to reviewing only matters of law.

Application: (Legal notion) A patent application consists of a description (specification), drawings (optional), claims and an abstract. The claims define the scope of the legal protection of the invention.

Appropriation: An agent's collecting or capturing (actively or passively) of economic returns (value) or other benefits derived from the investment efforts of that agent and/or from investment efforts of others.

Arbitrage: Earning something (esp. money) without investing (sacrificing) anything.

Asset: An investment or resource entitlement that can frequently be bought and sold on a market.

Assignee: A private or legal person to whom an assignment is made; grantee.

Autonomous entrepreneurship: independent inventors/small start-ups carrying out innovations.

Base technologies: Technologies that a business rests on and that are common to all competitors and do not in themselves allow for differentiation and premium pricing.

Basic patent: A key patent for a given technological area. A patent that forms the basis of a new technology or a new market.

Blanketing strategy: Efforts made to turn an area into a jungle or a minefield of patents, for example, 'mining' or 'bombing' every step in a manufacturing process with patents, more or less systematically. The strategy is used in emerging technologies when uncertainty is high regarding which R&D directions are fruitful or in situations with uncertainty about economic importance of the scope of patent.

Bottleneck technology: A technology that removes or relaxes critical constraints on technical performance, similar to an enabling technology.

Cannibalization: New products 'eat' sales from old products for the same firm.

Capitalize: The activities of creating a capital item in an accounting context from a resource.

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[160] This glossary is co-authored with Marcus Holgersson and Thomas Ewing.

Certainty equivalent: That amount of money obtainable with certainty that is equally preferred to an uncertain offering.

Claims: The "metes and bounds" of a patent are set forth by its claim(s). Each claim is required to be a one-sentence description of the invention. Claims may be directed to an apparatus, a chemical compound, a method of manufacture, the use of a device or a compound, etc.

Commercial success: invention starts to become economically useful/sold, i.e. an innovation is accomplished (if new to the world).

Complement: Two products are complements if a marginal price increase of one decreases the demand of the other, and vice versa. If this is the case for all price levels, the products are complements globally (the distinction between local and global complementarities are often not used). In formal terms this means that $\partial q_1 / \partial p_2 < 0$ and $\partial q_2 / \partial p_1 < 0$, where q_i and p_i for $i = 1{,}2$ are demand and price for two products. If $\partial q_1 / \partial p_2 > 0$, product 1 is a substitute for product 2. Complements and substitutes could be expressed in terms of cross-elasticities of demand instead, i.e. $(\partial q_1 / \partial p_2)/(q_1 / p_2)$. See also substitute.

Compulsory license: A license granted by a court or other public authority to a party having applied for it, allowing the party to use a copyright or patent without the explicit permission of the owner. Compulsory licenses usually require the payment of a specified fee to the intellectual property right holder. Provisions for the grant of compulsory licenses are found in most national IP laws, the USA being the most notable exception. Conditions of their grant are, however, very much restricted in the IP laws of the major trading nations.

Concurrent engineering: Performing various activities in an organization (e.g. in an R&D project) in parallel or with significant overlaps in time rather than in sequence.

Contributory infringement: Assistance in the unlawful making, selling, or using of a patented invention.

Copyright: An intangible, incorporeal right granted by statute to the author or originator of certain literary or artistic materials, such as plays, movies, and books. The copyright generally lasts for a specified period, with the sole and exclusive privilege of publishing and selling the work to lie with the right holder during this specified period. Most of the major trading nations specify a term constituting the life of the author plus either 50 or 75 years. Thus, the exact date of the expiration of many copyrights cannot be precisely determined. Works produced for hire are generally limited to a term of 100 years.

Core technology: a technology that becomes the competence of a certain company, with 3 properties: key (significant impact on customer utility), generic (widely applicable), and difficult to imitate.

Corporate entrepreneurship: carrying out of innovations within existing firms.

Corporate governance: The structure and processes by which corporations (large and small) are managed from the top, typically involving owners, board of directors and top management.

Cost: The monetary outflow from a company generated from its normal business activities, i.e. the monetary value that has been used to produce something (products and/or services). Costs can be fixed (not depending on the quantity produced) or variable (depending on the quantity produced). However, not all monetary outflows are costs. If the outflow is generated by an investment (see below), it is called a capital expenditure which is shown on the balance sheet and depreciated over time. Notice that the concept of "fixed cost" often is used for an investment, which in accounting terms is not a cost. Another word for costs is expenses.

Counterfeiting: To forge, copy or imitate without authority or right.

Counterpart patents (or subsequent patents): Patents in different countries besides the original one (the priority patent) for the same original invention. The corresponding subsequent patent applications are referred to as counterpart filings or subsequent filings.

Counter-patent: A patent used, or to be used, for retaliation or for exchange of patents of others.

Creative destruction: the process by which new technologies, products or firms substitutes old ones.

Critical mass: A volume or number of actors or units which is associated with a significant increase or decrease in the rate of change in a process, i.e. a sudden acceleration or deceleration, e.g. in a diffusion process.

Customer/user utility dimension (variable, parameter): Attribute (characteristics) of a customer or user that is psychologically measureable in a specific user situation, and directly relates to customer preferences, valuations, and economy. Typical examples are reliability, portability, satisfaction, comfort, noise, taste, and safety. Utility dimensions could be related to both benefits and costs (in a broad sense). Sometimes costs are treated separately for reasons of analytical convenience. Sometimes a technical performance dimension could be directly used as a utility dimension as well. Examples would be speed and weight if they directly influences customer economy in a user situation. Sometimes utility dimensions are reducible to one dimension that expresses overall customer value or profit.

Defendant: A person or party against whom relief or recovery is sought.

Demand curve: Functional relationship between a demand variable (typically quantity) and other variables (typically price). (See collection of formulas.)

Depreciation: An accounting measure which essentially means that an asset on the balance sheet is moved to become an expense at the income statement. The depreciation is not related to an actual cash outflow, but is instead related to a former investment which is depreciated over time as it is being used and the value decreases. There are different rules for depreciation in different countries, but one common model is to depreciate an asset linearly over a specific number of years. The logic behind depreciation is that an investment is not only used for one year, and therefore the accounting profit of the investing company should not be affected with the entire investment for the first year. Instead the accounting profit is affected throughout the lifetime of the investment, in general according to some rules defined by the tax authorities of each country.

Derivative asset: An asset with cash flow values depending on another asset by design.

Design: A design patent protects the appearance of articles of manufacture. The present term of a design patent is 14 years in the USA.

Diconvergence: A process with an interaction of mutually reinforcing converging and diverging forces, producing partial convergence and partial divergence.

Diffusion: The spread of an innovation through a population of potential users or producers, with or without modification. Usual distinctions are national/international, inter-firm/intra-firm.

Digital divide: A gap between developed countries that benefited more from technology (especially in digital era) rather than developing countries.

Diminishing marginal utility: Decreasing *marginal utility*, i.e. the second derivative of utility U is negative.

Diminishing returns: Decreasing *marginal product*, i.e. the second derivative of an output with respect to an input (other outputs and inputs being held constant) is negative.

Discovery: (Legal notion) A pre-trial procedure which allows litigants to obtain information from each other prior to trial. Discovery is limited in most civil law jurisdictions. Discovery practice in the USA is generally considered the broadest in the industrial world.

Diversification: The process by which the diversity of activity areas of an agent (e.g. a company) is increased. The activity areas may relate to businesses, markets, products, resources, technologies, etc.

Diversification (financial): Adding more assets to a portfolio with the intent to reduce the portfolio risk.

Diversifiable risk: That portion of total risk in an asset portfolio that can be reduced by investing in various different additional assets.

Dynamic pricing: Time dependent pricing.

Early/late mover advantages: Types of advantages that accrue to early and late movers respectively in a process.

Economic growth: Increase in physical volume of sales (e.g. number of new products sold) or to monetary variables (e.g. revenues of the producer, innovator or entrepreneur). This might occur in terms of increases in GDP, sales and value creations, and ultimately and hopefully to welfare in terms of quality of life and happiness. An important component of economic growth is growth of R&D, new knowledge, including new technologies, and innovations, which in turn lead to growth of intellectual capital.

Economic success: invention/innovation gives a positive RoR on total investments, using a proper discount rate.

Economies of scale: Benefits gained from doing the same thing in larger quantities or repeatedly. In production cost terms, economies of scale are present when the average cost per unit produced is decreased when quantities are increased.

Economies of scope: Benefits gained from doing different things at the same time. In production cost terms, economies of scope are present when the cost of producing several products jointly is less than the aggregate cost of producing them separately (e.g. in separate plants or firms).

Economies of space: Benefits gained from doing something in particular locations.

Economies of speed: Benefits gained from doing something faster or earlier in time. Related to advantages.

Elasticity: The x-elasticity of y = f(x) is defined as $\frac{dy}{dx}\Big/\frac{y}{x}$ or the relative or percentage change of y, i.e. dy/y, divided by the relative or percentage change of x, i.e. dx/x.

Emerging technologies: New technologies that may come to influence the competitive positions of a group of competitors.

Enabling technology. A technology solving a bottleneck problem in a design, enabling a new functionality, or extending the performance limits of other technologies.

Entrepreneurial financing: Financing of entrepreneurial activities, typically launching a firm or a project or a venture with high uncertainties and risks involved and long lead times to pay-offs. Providing and/or obtaining funds or capital under high risks.

Entrepreneur: An actor combining resources, including new ideas, for launching of products, processes or services that are new to a local market, an organization, or a society, but not necessarily new to the global market or to the world.

Entrepreneurship: The realization of innovations on the market. Usual distinctions are autonomous/corporate/state/university.

EPO: The European Patent Office based in Munich. As of 1998, the EPO has not been an agency of the European Union. The EPO was created by the European Patent Convention and began operations in 1978. The EPO can grant a valid patent for all EPC signatory states.

Equilibrium: A system is in an equilibrium state if there are no forces active to change it away from the state.

- An equilibrium is *locally stable* if the system moves back to it after small enough changes, otherwise it is *unstable*. If the system moves back for any arbitrary large changes, it is *globally stable*.
- An equilibrium is *locally optimal* with regard to some performance criterion or objective function if there is no better state arbitrarily close to it. If there is no overall better state it is also *globally optimal*.
- An equilibrium, if it exists at all, may be unique or it may be one out of several multiple equilibriums.

Equivalents, doctrine of: Interpretation of the scope of an invention which is broader than the literal wording of a patent claim. The doctrine of equivalents is a concept applied in determining infringement.

Espionage: An attempt to obtain information without the knowledge and consent of its possessor. Usually considered illegal and/or immoral.

Essential patent: Roughly synonymous with “strategic patent” (although the term is usually employed in a somewhat weaker meaning of high invent-around costs).

Evergreening: Extending the effective protection of an innovation by various managerial, technological and legal means.

Expiration: All intellectual property rights except trademarks (trade names) and indications of origin exist only for some limited term. Thereafter the goods or service etc. may be freely used by anyone without permission of the former holder of the right.

Externality: An externality is a non-market link between two or more agents with interdependent decisions. If the decision of one agent affects the other positively or negatively without any transaction between the two taking part, the externality is respectively positive or negative. If the decision is a consumption decision we have a consumption externality, and if it is a production decision we have a production externality.

Fair use: permission to copy a document in limited number for academic purposes.

Fencing strategy: a situation where a series of patents, ordered in some way, block certain lines or directions of R&D. This strategy is typically used for a range of possibly quite different technical solutions for achieving a similar functional result.

File early, file often: A patenting strategy in which a company files patents continually on minor improvements, even while research and development of the whole invention continues. The strategy is often adopted in highly competitive industries.

File wrapper estoppel: Admissions of various sorts by the applicant during prosecution of a patent application that may be used for a restrictive interpretation of claims in infringement procedures.

Financing: Providing and/or obtaining funds or capital, typically for an investment.

First mover advantages: Advantages drawn from being first with something, e.g. being first to file a patent application for an invention gives the opportunity to get patent protection.

First to file/ First to invent: An inventor can be defined as either the first person to conceive of an invention or the first person to file a patent application on the invention. All major nations except the

USA follow a first-to-file patent system (as of 1998). The maintenance of this type of patent system requires the patent office to review and rule on information not required by first-to-file patent systems; see "interference".

Franchising: selling the rights to a proven business method – often the right to sell a product or brand names.

Free rider problem: the problem arising from imitators imitating without having to pay for the investment.

Function in patent claims: Patent claims may be of the “means plus function” type. In this approach, an element of a claim may simply state that a capability be provided for performing a particular function.

Generic technologies: The broader scientific and technological areas from which a cascade of technologies emerges (e.g. electronics, based on solid state physics etc. (scientific areas) and containing technologies such as electronic hardware, microelectronics, etc.).

Genuine uncertainty: Complete uncertainty about any probabilities or even uncertainty about the event structure.

Global innovation system: An innovation system of some type with a set of actors, activities, resources and institutions that is globally composed and governed and is addressing global problems and challenges for global benefit.

Global-for-global innovation: Innovative work performed globally for global use. (Cf. local-for-local innovation as being performed locally for local use etc.)

Governance: An umbrella term for rule-based institutions coordinating economic and social activities, with management hierarchies and competitive markets as two main polar types of institution.

Governance cost: The general costs associated with governing or coordinating economic activities. If these activities are organized within a firm or organization they are called management costs. If they are performed as transactions between actors on a market they are called transaction costs.

Governance failure: Broad term for capsuling market, governmental and management failures.

Governmental failure: Inadequate or inefficient government measures for designing, regulating or enhancing markets and other economic institutions as well as for correcting market failures and institutional shortcomings.

Grace period: Some countries (e.g. the USA) allow patentees a grace period between disclosure of a patentable invention by the inventor and the filing of a patent application. In most other jurisdictions public disclosure prior to filing destroys patentability.

Growth appropriation: The appropriation of economic growth effects (such as employment and externalities rather than only returns) from investments, e.g. in a firm or in a nation, generated by public and/or private investments in R&D and innovations.

Hedging: Insuring against or reducing financial risk.

Hold up situation: situation in which individual companies have bargaining power to hold up further developments for some time.

Idea: (Legal notion) In the Anglo-American legal system, the law of undeveloped ideas is an accumulation of common-law opinions addressing a claimed right to compensation for a defendant's unauthorized use of the plaintiff's idea. All of these opinions require that the plaintiff's idea be novel and concrete.

Imitation: A close reproduction or near duplication of ideas, practices or objects that were once perceived as inventions (or innovations). Imitations are sometimes true copies (as with piracy goods) but typically involve modifications and often also improvements of the innovation.

Imitator: An actor that has been involved in the development of an imitation of an innovation.

Increasing return: increased product attractiveness due to adoption. The returns (benefits) to the next adopter are increased with the number of previous adoptions.

Increasing/Decreasing/Constant returns to scale: The case when a certain %-age increase in all inputs gives a higher/a lower/the same %-age increase in output.

Incumbent: see new entrant.

Industrial network thinning: A thinning of the industrial networks connecting various actors such as users, producers, researchers, innovators, entrepreneurs, etc.

Inflation rate: The relative loss of purchasing power.

Information asymmetry: A difference in information held by two agents or players in a market or in an organization.

Information paradox: the difficulty (impossibility) to sell information without risking having it stolen when disclosed for buyer inspection.

Infringement: The unauthorized making, using, offering, etc. of an invention covered by a valid claim of a patent during the life of the patent.

Injunction: A court order prohibiting someone from continuing to proceed with some specified act or commanding someone to undo some wrong or injury. In patent litigation, the patentee may be granted an injunction against further unauthorized use etc. of the patented product or process by the defendant. To lift (annul) an injunction is termed injunctive relief.

Injunctive relief: See injunction.

Innovation (technical or technological): An invention that has found a useful and commercially viable application. (Many definitions exist.) Usual distinctions are radical (or major)/incremental (or minor); product/process; technical/managerial (or organizational)/financial/social, etc.

Innovation races: A broad term for describing different kinds of races in introducing an innovation to the market and its early adopters and lead users.

Innovation system: In a loose sense a system that involves the provision of innovations. These systems usually comprise actors, artifacts, knowledge and institutions, usually with economic functions and performance criteria. They can be defined at various levels – national, regional, sectoral, corporate, etc., and can be hierarchical or non-hierarchical (as in some nations and commonly at sector level). Many definitions and types exist. See also 'national innovation system'.

Innovator: An actor that has been involved in the development of an innovation up to and including its launching on a market or initiating its use in some application.

Installed customer base: The set of products, of the same type, in use among customers.

Intangible assets: Non-tangible assets, such as IPRs, knowledge and human capital.

Intellectual capital: Non-physical, non-financial and non-tangible capital, or capitalized intellectual resources or assets.

Intellectual capitalism: A economic system with basic capitalist institutions in which intellectual capital plays a major, if not dominant, role in some sense.

Intellectual property (IP): Certain creations of the human mind are given the legal aspects of a property right. Intellectual property is an all-encompassing term, which includes patents, copyrights, trademarks, trade secrets, right to fair competition, and moral rights.

Intellectual property (IP) rights : The legally recognized ownership or usage right to an intellectual property.

Intellectual rights: Rights in intangible or intellectual resources and creations, propertized or not. IPRs, being property-like rights, are sub-rights to intellectual rights.

Intelligence: Collection and analysis of information through legal and illegal means, e.g. espionage.

Interference: In a first-to-invent patent system, an interference is a proceeding at the US Patent Office to determine the priority of invention between competing claimants, and thus entitlement to the patent.

Invalidation: Only a valid patent may be enforced. Thus, defendants in patent infringement litigation normally attempt to have the patent invalidated, thus making the suit moot. Defendants may attempt to show that the patent holder committed some type of fraud towards the patent office or that a patent should not have been granted due to prior art not having been interpreted properly or not having been kept confidential during prosecution.

Invent around (design around): Competitors will often attempt to avoid literal infringement of a patent by designing their invention in such a way as to avoid the patent claims. However, the laws of most of the major trading nations recognize that the scope of an invention may be larger than the literal wording of its claims (see: Equivalents, doctrine of.)

Invention, patentable: Most patent systems require patentable inventions to be those works of the mind which are novel, non-obvious, and industrially applicable. An invention must be novel, i.e. distinguished from what came before it, and must not be obvious to a person skilled in the relevant field (technological area) of the invention.

Invention (i.e. technical): The first idea, sketch or contrivance of a new-to-the-world product, process or system, which may or may not be patented (Freeman et al. 1982, p. 201). (Many other definitions exist.)

Investment: The monetary outflow related to a purchase of e.g. machinery or some other kind of asset which will be giving returns for more than one accounting time period (in short sacrificing something for some future benefits – c.f. arbitrage). This means that the investment is not accounted as a cost at one single time, but it is instead depreciated over time (e.g. over five or 20 years).

IP Assembly problem: the problem to collect (assemble) necessary IPRs for a product.

IP disassembly: Separating and disintegrating (disentangling) intellectual properties of two or more firms/business units/individuals/resource sets that previously have been integrated in some way.

IP regime: A type of IP-based governance, oriented around particular IPR-types and their associated legislation and enforcement. Thus, one talks about strong and weak IP regimes (referring to strength of legislation and enforcement) and patent vs trade secret regimes (referring to the particular dominant IPR type).

IP volunteering: Waiving of IP-related rights without any claims for direct monetary compensation that in principle could have been justified.

Key patent(s): The most technically and economically important patent(s) for a specific product or process.

Key technologies: Technologies which directly influence those product performance and quality parameters that target customers are willing or prepared to pay a premium price for. Key technologies are also those (process) technologies that allow for major cost reduction if they are applied in the production process.

Laid-open publication: A patent application is kept confidential until either the granting of a patent, or in most countries, until the passage of a certain period of time, usually 18 months. If the patent application is still pending at the end of the time period, the application will be laid open for public inspection or published.

Level of inventiveness ("non-obviousness"; "technical progress"; "technical step";): In order to be patentable, an invention must be novel and non-obvious beyond what would be readily apparent to a person skilled in the relevant field. The novelty requirement for copyrighted works is very low. In some cases, the mere selection and arrangement of information is protectable by copyright.

License: A permission granted by an IPR holder, the licensor, to another legal entity (person or company), the licensee, to make use of, sell or otherwise benefit from the underlying intellectual property under certain restrictive conditions. To license (as a verb) means granting such permissions, more precisely referred to as licensing out. Licensing in then refers to acquiring licenses. Licensing is distinct from directly selling or transferring the property rights themselves. Licenses could be granted for any type of IPR, i.e. for patents, trade secrets, trademarks, copyrights, designs etc. There are many possible contractual variations of license agreements. Common types of licenses include exclusive license (for only one user), sole license (for only one user besides the licensor), sub-license (the licensee permits another licensee in turn), compulsory license (a license which has to be offered), grant-back license (the licensee has granted the licensor licenses on improvements made by the licensee), cross-license (licenses are swapped between licensor and licensee) and block-license (license for a bundle of IPRs, e.g. a package of patents).

License broker: person(s) acting as middle-men in a license trading, possibly own the license for temporary period.

Litigant: Party involved in litigation, either defendant or plaintiff.

Litigation: A contest in a court of law for the purpose of enforcing a right or seeking a remedy; a judicial contest.

M-form: A special form of corporate organization in which several decentralized business divisions integrating industrial functions like R&D, production, marketing and purchasing often oriented around products or areas, enabling them to operate on an accountable profit/loss basis, under the strategic guidance of a corporate headquarter. This form is distinctively different from the functional form of corporate organization (the U-form) in which main industrial functions are disintegrated at the highest level of organization.

Mailbox patent: In US patent practice, many Japanese inventors simply want their JPO applications translated into English and then filed with the USPTO without change. The resulting US patent is probably not as high-quality as it would be if an American patent attorney or agent were free to adapt the Japanese application to US practice.

Management cost: See governance costs.

Management failure: When the term is used to correspond to market failure (or market inefficiency) it refers to a situation in which management or some mechanisms fail to provide products or services or allocate resources in an efficient or satisfactory way seen from a societal point of view.

Marginal utility: Derivative of utility U wrt quantity q or quality T, i.e. U'_q or U'_T.

Marginal product (productivity): Derivative of an output product with respect to an input factor with a given production function.

Market clearance: The actual event when supply meets or equals demand with neither excess supply nor excess demand.

Market failure: A situation in which a market or market mechanisms fail to provide products or services or allocate resources in an efficient or satisfactory way seen from a societal point of view.

Market lead time: The time difference between a leading (innovating) company's market launch and the next market launch of a following (imitating) competing company. Timing of other imitators entering the market is also relevant, so the complete sequence of market entries and corresponding market lead times can also be incorporated into the concept.

Market segment: A cluster of customers having similar purchasing behavior.

Mean-variance analysis: Investment or asset portfolio analysis based mainly on expected value, variance and covariance of uncertain (stochastic, random) returns.

Micro legal analysis: Applied to property rights, this means the analysis of a particular right seen as composed of a bundle of sub-rights and related to neighboring rights ("side-rights") and overarching rights ("super-rights") regarding the design, origin, structuring and implications of the rights.

Misappropriation: The unauthorized, improper, or unlawful use of property for a purpose other than that for which it was intended; stealing.

Moral rights: The rights of the creator of a work of intellectual property regardless of who owns the work. Not all legal systems recognize these rights. Moral rights applicable to authors of copyrighted works include the right to claim authorship, the right to prevent use of one's name for works which one did not author, the right to prevent the use of one's name on works which have been distorted or mutilated, the right to prevent intentional distortion or mutilation, and the right to prevent change or destruction of a work of recognized stature.

Multi-generation patent: Patent that reads on several generations of a product or process (e.g. patents that read on both 3G and 4G in mobile communications).

Multi-generation technology: Technology that supports several generations of a product or process.

Multi-standard patent: Patent that reads on several standards (e.g. competing standards in mobile communications).

Multi-technology corporation: A corporation operating in several technologies (as a result of technology diversification).

National entrepreneurial system: Set of distinct institutions which jointly and individually contribute to the development and diffusion of new firms and businesses and which provide the framework within which governments form and implement policies to influence the entrepreneurship in its various forms (autonomous, corporate, state, etc.). (Aligned with the definition of National Innovation Systems in Metcalfe (1992, p. 82).)

National innovation system: "Set of distinct institutions which jointly and individually contribute to the development and diffusion of new technologies and which provides the framework within which governments form and implement policies to influence the innovation process." (Metcalfe, 1992, p. 82)

Network externalities: Externalities accruing to agents because they are linked to each other through a network.

New entrant: a company is a new entrant on a market if it is new on that market in the relevant period considered. If it is not, i.e. if operated in the market also in the previous period, the company is an incumbent.

NIH sentiment: Abbreviation of Not-Invented-Here, meaning a negative attitude to a new idea or new technology among people who have not been part of the invention process.

Non-producing (non-practicing) entity: An entity (individual, organizational) that asserts and exploits patents and patent portfolios, typically with a business model to extract license fees,royalties and damages and/or leverage equity in the shadow of litigation, without actually using them in industrial practice, e.g. in production. A wide variety of entities fall in this category and are referred to by various labels, e.g. patent assertion entities, patent monetizers, patent trolls and patent extortionists.

Non-obviousness requirement: An invention is not patentable if, at the time it was made, a person with ordinary skill in the relevant art and knowledge of all relevant prior technical information would have been able to make the invention, for instance by combining the information contained in the prior art documents.

Pacing technology: A technology in an early development stage with a verified potential for influencing product performance, quality and/or production cost.

Patent: The term is short for "letters patent" (see e.g. David 1993 for the origin of the term). A patent is a limited-term monopoly provided to inventors/applicants who file a patent application. All patents are published so that the general public will know of the invention and be informed of how it works.

Patent auctions: Auctions of patent rights, constituting a market for technology trade.

Patent awareness: The sustained consciousness about the existence of patenting possibilities.

Patent family: A set of patents granted in different countries for the same original invention.

Patent flooding: See “file early, file often”. Patent flooding is a slightly more extreme version, used e.g. in Japan to force cross-licensing arrangements between holders of basic patents and holders of many patents with minor variations of the basic patent.

Patent insight: The firsthand experience of having utilized patenting possibilities.

Patent power: The bargaining power associated with the patent portfolio of an actor.

Patent right: An exclusive temporary (normally for at most 20 years) transferable right to exclude others from commercializing or trading what is patented (usually a technical or industrial invention), (which is not the same as the right to exploit a patented invention). See also ‘intellectual property right’.

Patent troll: Non-producing or non-practicing entity (NPE) with a primary business model of collecting damages or licensing royalties in the shadow of patent litigation.

Patent understanding: The ability (capability) to evaluate patenting possibilities.

Patenting frequency: The number of patents obtained through granting per time unit (usually per year) for a practicing entity (such as an inventor, a company or institute, or a university).

Patenting propensity: The propensity (or probability) of a practicing entity (such as an inventor, a company or institute, or a university) to apply for a patent, given a patentable invention.

PCT (Patent Cooperation Treaty): This treaty permits a single patent application to be filed in multiple countries. The patent's filing date is the date on which it was filed in the first signatory country. PCT applications receive their patent search in the first country in which they are filed. The subsequent search report is provided to all the national patent offices which subsequently review the application. This treaty is the closest agreement presently in force which amounts to an international patent.

Pending: The term “patent pending” means a patent has been applied for but not yet granted.

Perfect competition: A market structure characterized by a.o. no excess profits and perfect information.

Piracy: See “counterfeit”.

Plaintiff: A person who seeks remedial action for an injury to rights in a court of law.

Policy: Prescription ex ante of principles, guidelines, conditions and preferred courses of action for achieving certain goals or objectives of an organization, a nation or some other decision-making entity.

Policy convergence: Increases in similarity of types and characteristics of policies in a certain field, between different nations or other entities.

Preliminary injunction: An injunction which may be granted to a plaintiff upon an inter-party showing that the defendant is likely to continue with, or refrain from doing, an act, the right to which is in dispute. While injunction practice is complex, the granting of a preliminary injunction should occur when: $P \bullet Hp > (1-P) \bullet Hd$, where P is the plaintiff's probability of winning the trial, Hp is the harm to the plaintiff from not granting the injunction, and Hd is the harm to the defendant from granting the injunction.

Price differentiation: Prices are set so different customers or groups (segments) of customers have to pay different prices for the same products or service.

Price takers: Prices are given rather than set by individual market actors, which just have to accept them i.e. “take” them.

Principal agent problem: The problem arising from having a principal (typically an owner) having different preferences (utility function) from an agent (typically a manager) hired to act (manage) on behalf of the principal, who also has less access to relevant information than the agent.

Priority: Two different inventors may submit patent applications on the same invention. The priority date is the date of the earliest invention. In first-to-file systems, the priority date is the same as the filing date. In first-to-invent systems, the priority date is effectively the earliest date upon which the invention was conceived.

Priority application: The original patent application filed at some patent office in the world for a particular invention. This application then gives the applicant priority to the invention for a certain amount of time for filing patent applications at other patent offices for the same invention.

Priority date:. In first-to-file systems for patent applications, the priority date is the same as the filing date. In first-to-invent systems, the priority date is effectively the earliest date upon which the invention was conceived.

Priority patent: Patent on a specific original invention. Filings or applications for these patents are referred to as “first filings”, “priority filings” or “priority applications”. See also “counterpart patent”.

Process innovations: Innovations related to processes such as manufacturing methods, typically generating savings through cost reductions at the producer end and thereby potentially generating profits and/or sales growth and/or customer values through price reductions.

Product differentiation: A product development strategy or phenomenon that results in several products with the same function and appearance at large but with minor differences that makes them distinguishable.

Product diversification: The expansion of the range of product areas of a company, in other words the process by which new product areas are entered by a company.

Product innovation: An innovation that generates new or improved functionalities and performance levels in use which generates additional user or customer value. This might in turn generate growth of sales and profits for a company or an actor launching an innovation through the diffusion or market penetration of the innovation in question.

Profit: In general terms the difference between revenues and costs. The profit of a company can be given on different levels, e.g. profit before or after taxes. Other common words used for profits are income and earnings.

Propertize: The actions of creating a property from a resource, e.g. obtaining a patent on technology.

Prophylactic disclosure: Disclosure of technical information with the intention to hinder patenting.

Proprietary vs. open standards: Standards which are privately owned or controlled and standards which are not.

Racing game: A game in which each player prefers to move rather than to wait.

Rate of return on investment: Return on investment divided by the amount invested.

Research and development (R&D): A shorthand definitions is: Searching and researching for new knowledge, solutions, explanations and ideas that can be useful in developing new things, soft or hard.

Return on investment (RoI): The difference between economic benefits or amounts received from an investment and the amount invested. The RoI may be calculated for different actors or entities involved in and benefitting from the investment. A common distinction is between private RoI, pertaining to private actors, and social RoI, pertaining to a society or community.

Revenue: The monetary inflow to a company generated from its normal business activities, which normally involves sales of products and/or services. Revenues can also be generated by for example interest, and one needs to be careful of what is included in the concept in each given situation. Normally one refers to revenue for a specific time period, e.g. for a year. Notice that revenue, sales and turnover are different words for the same concept. The revenue can be found at the top line of the income statement (where the revenue from e.g. interests is not included). Notice that income in some situations is used with the same meaning as revenue, but most often as another word for net profit.

Reverse engineering: An engineering process by which a product or a production process is disassembled and analyzed with the purpose of learning its design and function.

Revocation: A process by which a patent is declared invalid. This can occur either in a court of law or by action of the patent office.

Risk: A measure of negative consequences of an event or decision. Various measures of risk exist. A common one is based on the variance or standard deviation of a random variable.

Royalty stacking: A product/service requiring several licenses with royalties being added to each other.

Sailing effect: improvements in late stages of a maturing technology in response to a perceived threat of a new technology.

Secrecy strategy: A mode of using trade secrets strategically.

Secrecy structure: fragmentation of proprietary information in the company for secrecy purpose.

Seminal patent: A patent that gives rise to several follow-up patents.

Settlement: Since litigation is expensive and time-consuming, the parties generally benefit by concluding their dispute prior to a full courtroom battle. Settlements can be reached in a variety of ways, including arbitration, negotiation, and mediation. Settlements do not generally require the approval of the court.

Serendipity: A discovery made while searching for something else.

Skunk work: guerilla work, “under the table R&D”. Innovation work that is not under attention (supervision) of management, and may not be in line with company decisions/policies.

Speed to market: Term often used instead of time to market or to describe how fast certain operations leading up to market introduction have been completed.

Spin-off: an invention, project or company disintegrated from a mother organization (typically through sales).

Spill-over: An information externality, i.e. information not subject to exchange on a market.

Strategic patent: A patent that is necessary for doing business in an area, i.e. a patent with insurmountable R&D costs necessary to invent-around. See also essential patent.

Strategic patenting: Strategic patenting is loosely defined as working toward maximizing the asset value of an invention. This relates not only to when the patent is allowed to be issued, but also to which part of the technology is protected. It also entails monitoring competitors' products and proactively reviewing the scope of patent claims to ensure that, on issue, the patent is likely to cover those competing products. If correctly managed, strategic patenting can result in a patent portfolio of significant commercial value.

Sub-technology: A specialized knowledge part of a technology. In a classification of technologies, a certain technology at some level of classification is disaggregated into sub-technologies at lower levels.

Submarine patent: In the USA, patent applications were previously kept in secret until a patent was granted, i.e. there was no pre-grant publication system. Because patent applications may take years, in some cases many years, before being patents, an invention might mature into a patent long after others have started using the invention. This time lag allowed a company to create a so-called submarine patent, which essentially forced those using the underlying technology to purchase a license on the patent or face a lawsuit for patent infringement when the patent was finally granted and published. In those patent systems which routinely publish all patent applications within a specified time after filing (18 months) this is a minor problem.

Substitute: Two products (or resources, e.g. technologies) are substitutes if their prices and demand are interdependent but the products are not complements (see this word). In formal terms, product 1 is a substitute for product 2 if $\partial q_1 / \partial p_2 > 0$. Since the sign of this partial derivative may depend on the price levels, it means that being a substitute is a local property. If the sign does not change, product 1 is a global substitute. Complements and substitutes could be expressed in terms of cross-elasticities of demand instead, i.e. $(\partial q_1 / \partial p_2)/(q_1 / p_2)$. See also complements´.

Sui generis: A unique legal solution which does not fit into any pre-existing legal category. Lat.: of its own kind or class; i.e. of no other kind.

Sunk costs: Costs which are bygones, i.e. cannot be recovered.

Supply curve: Functional relationship between a supply variable (typically quantity supplied) and other variables (typically price). See formula collection.

Surrounding strategy: the strategy when an important central patent of some kind, especially strategic patent, can be fenced in or surrounded by other patents, which are individually less important but collectively block the effective commercial use of the central patent, even after its expiration. Typically, surrounding patents relate to different applications or complementary modifications of the basic patent.

Switching cost: the cost for a buyer to switch to another seller.

System: A set of components, related (connected) to each other in some way. Usually a system is functional in some sense with respect to some associated performance criteria. Moreover a system has boundaries across which it interacts with its environment through inputs and outputs; it has internal structures and processes, with feedbacks as an especially important type; it could be hierarchical or not and is decomposable into sub-systems. The components of systems could be almost anything – ideas, artifacts, humans, organizations.

Tax: A financial charge to the state. For companies, there is normally a tax on profits, which means that a certain share (e.g. 30%) of the profit is paid to the state. Notice that the tax is dependent on the accounting profit, i.e. related to other accounting measures, e.g. depreciation.

Tax shield (or depreciation tax shield): The positive effect from an investment related to the lowered taxes which the depreciation of the investment implies for a profitable company. If e.g. an investment of I is depreciated over Y years and tax rate is τ, then there will of course be a cash outflow of I when the investment is paid. However, there will also be savings of $\tau(I / Y)$ for each year during which the investment is depreciated due to the lowered accounting profits which also lowers the taxes.

Technical bottleneck: A technical condition or problem that severely constrains the achievable technical performance of a product, process or system.

Technical knowledge: See technology.

Technical performance dimension (variable, parameter): Attribute (characteristics) of a product or process that is physically measureable and related to its engineering design and possible to relate to functionality or utility. Typical examples are weight, size, speed, smoothness, durability, energy efficient, and material consumption.

Technical success: invention (new product/process) accomplished, technical specification is met.

Technological coexistence: A situation where two or more technologies coexist on a market or in an organization for some period of time.

Technological convergence/fusion/confluence: A process by which two or more technologies are combined more and more frequently and possibly merge into a new kind of technology (e.g. mechanics and electronics merging into mechatronics).

Technological innovation: Innovations that are technological in nature, i.e. being based on new technical knowledge.

Technological lock-in (lock-out): A technology which becomes dominant (marginalized) through a sequence of adoption decisions by individual actors or agents.

Technological substitution/competition/complementation: Cases when two technologies coexist and one grows on behalf of the other/both compete, perhaps "back and forth"/both grows together.

Technology: A body of knowledge about techniques and technical relationships, typically regarding ways to transform material matter to achieve more desirable physical effects. The body of knowledge referred to may be more or less specialized.

Technology base: Essentially the same as a technology system, but any interdependencies that may or may not be present are not explicitly referred to. Usually a technology base is considered in connection with a product (or service) or an actor who is in possession or some sort of control of the technologies in question.

Technology convergence/fusion/confluence: a process by which two or more technologies merge into a new kind of technology (e.g. mechanics and electronics merging into mechatronics).

Technology diversification: The process by which a company (or more generally an economic entity, such as a nation, region, organization, individual) extends its activities into technologies new to the company, thereby extending its range of technologies.

Technology monopoly: A situation where one technology dominates a 100%, or close to it, over other technologies on the market.

Technology push vs. demand pull: Two models, types or phases of innovation processes characterized by exploitation or technological opportunities or market need respectively.

Technology system: A set of interrelated technologies. The technologies may be interrelated conceptually or causally, and in the latter case they are interdependent. A technology system is moreover to be distinguished from a technical system, which essentially is a set of physical parts or products or artifacts, i.e. a “hard” system.

Technology trade: Trade with patents, technology licenses and technical know-how.

Technology transition (or technology base shift): A change in a technology base that involves an addition and/or deletion (substitution) of one or more technologies, rather than just an advancement of knowledge within given technologies.

Time to market: The time it takes for a company from their start of relevant R&D to the launching of a resulting new product or process on a market.

Tort: A private or civil wrong or injury.

Trade secret: A pattern, formula, device, or compilation of information which is valuable to a given business and not publicly known. The owners of trade secrets are protected against the theft of their secrets by others. The owner of a trade secret must usually make efforts to keep it secret in order to obtain any legal protection through trade secret rights.

Trademark: A distinctive mark (word or figure) through which products of particular manufacturers may be distinguished from those of others. Most of the world's major trading nations maintain offices in which trademarks may be registered.

Trademark dilution: special threat to trademark that it becomes so successful that it is incorporated in everyday language and loses its distinctiveness that is required for legal protection.

Transaction cost: The cost for conducting a transaction on a market, in addition to the cost or price for the product or service transacted.

Threshold/critical mass: A volume or number of actors or units which is associated with a significant increase or decrease in the rate of change in a process, i.e. a sudden acceleration or deceleration, e.g. in a diffusion process.

Unit demand: Each customer demands just one unit.

Utility: Measure (U) of subjective benefit or satisfaction an agent (typically a consumer) attaches to the possession of products (commodities) of various quantities (q) and qualities (T) (performance, attributes), generally written U = (q) or U = U(T).

Venture capital (VC): Funds or capital provided for risky undertakings or projects or entrepreneurial activities under risky conditions. Depending upon the source of VC one can distinguish between autonomous (independent, angel) VC, corporate VC and state VC.

Waiting game: A game in which each player prefers to wait rather than move.

Welfare: Societal value (to be distinguished from social welfare subsidies). Wide term describing, e.g. health, happiness, qualities of life or general well-being.

Willful infringement: Infringement by intent. E.g. counterfeiting, whereby the infringer knowingly or willfully copies a protected work.

Willingness to pay/customer value: The highest price a customer is willing to pay for a product or service. This price normally reflects the value the customer attaches to the product or service, which is also called the user value in case the customer and user is the same actor.

Window acquisition: an action of a firm acquiring another firm in order to have presence in the board member.

Writ: A written judicial order to perform a specified act. Failure to respond to the writ may be punishable as a crime.