

post-Mayo/Biosig/Alice – The Precise Meanings of Their New SPL Terms^{1.a)}

Sigram Schindler, Bernd Wegner, Juergen Schulze, Doerte Schoenberg
TU Berlin & TELES Patent Rights International GmbH Berlin

I. THE post-Mayo/Biosig/Alice REFINED NOTIONS OF SPL PRECEDENTS FOR ET CIs

This paper precisely defines the new and fundamental notions^{1.b)2.a)} that the Supreme Court unanimously introduced into SPL precedents for ET CIs by its *KSR/Bilski/Mayo/Myriad/Biosig/Alice* line of decisions, i.e. of the terms “scope”/“definiteness”/“preemptivity”/“natural phenomenon”/“abstract idea”/“categories of patent-non-eligibility”. Hitherto, none of these notions was precisely understood, making SPL precedents on ET CIs error prone – see recent CAFC decisions [163], broadly criticized by patent experts at the USPTO event on patent quality [193], not aware of the semiotic necessities of adjusting SPL precedents to the needs of ET CIs [].

FIGS 1&2 are key for grasping the many strong interdependencies SPL imposes on these notions: Any one of them is defined only if all notions it “uses” are^{2.b)}. A statement on one of these notions and ignoring such an interdependency is flawed. The reasonability of the crucial notion “abstract idea” will be made evident. In total, for the first time all these notions will be precisely defined and any question about them clearly answered – enabled by the Supreme Court’s above line of decisions.

FIG 1: The Subtests Used in the Classical and in the Refined Claim Construction
FIG 2: The Semi-Automatic FSTP^{FFOLLIN}-Test of a CI’s TT0 – required for ET CIs.

As to [183], FIG 1 is left unchanged and FIG 2 only slightly refined^{2.a) 3.a)}.

¹ **a.** SPL = Substantive Patent Law = 35 USC §§ 101/102/103/112; ET/CT = Emerging/Classic Technology; CI = Claimed Invention; NPS = National Patent System. This paper continues [183], not considering these notions in any other context, and in particular not “per se”/“as such”, as this were totally irrational.
b. A “term” is an “identifier/name”. A pair <“term”, its “meaning”> is called the term’s “notion”.

² **.a** All notions are defined, for a TT0, by **1.)** assuming it had passed the whole FSTP-Test, **2.)** deriving these TT0 notions’ precise meanings (in mathematical KR) from the so achieved TT0 presentation by its BAD/BED-inCs [183]. Without **1.)**, these notions are only “indicative”/“intentional”, i.e. not defined/-able.

In Physics it is usual to perform such “retrospective”/“fiction based” definitions: There – for finding out what a system’s properties in its equilibrium state are – one always **1.)** assumes it had already reached the equilibrium state, **2.)** determines, in this state, relations between its constituents. Taking a TT0 as being the analogon to a physical system, its analogon to the latter’s **a)** equilibrium state is that it has passed the whole FSTP-Test, i.e. satisfies SPL, and **b)** relations between its constituents are TT0’s relations between its inCs and these notions. An even closer such analogon – as also “sub-Physics”, just as SPL notions, “SPL loaded” instead – exists in Mathematics’ foundation, i.e. in Measure Theory [191].

All above notions are defined by assuming the BAD/BED-inC instantiations are known. In a specific TT0’s SPL test their values are needed. This usually will require reiterating the determinations of all these instantiations until they all are consistent. Thereby not only the currently performed claim construction is readjusted but even the claim interpretation preceding it [183]. Also the refinements/disaggregations may be reiterated – here assuming the product of their domains may not be disaggregated into a an equivalent but non-isomorphic way. The next Sections show: Without reiterations S and S^R for a TT0 – and relating them to their definitions^{6.a)} – this consistency is hardly achievable.

.b There is not only a “use-hierarchy” – defined by David Parnas [122] – between the FSTP-testi’s, as it here is reasonably assumed for efficient execution of the FSTP-Test. The reason being: SPL also imposes the inverse relation on these testi’s: Thus, for the above notions defined by the testi’s, SPL (in the Supreme Court’s interpretation by its above line of decisions) clearly implies^{2.a)} that, for a TT0, “any of these notions is defined only if all such notions are defined”, too – explaining why one cannot prove FSTP-testi’s holding independently of \forall FSTP-testi’s holding, $1 \leq i, i \leq 10$, repeatedly reminded of below.

II. PRECISELY DEFINING THE NOTIONS OF “SCOPE” & “DEFINITENESS”

While the ambitions of the FSTP-Project in total reach out very far – at developing an extremely powerful IES [161], for which an in SPL precedents hitherto unknown/non-practiced notional preciseness is indispensable – here this preciseness is introduced and its implied necessary subtlety of reasoning is explained. This is done by means of the FSTP-Test, FIG 2, also being the backbone of the IES.

The following elaborations on SPL encounter legal questions – below identified by “(!)” and not yet settled by SPL precedents, as not so precise about these new notions – which must be answered for ET CIs here for not getting blocked by them. These answers should be in line with the Supreme Court’s above decisions^{3.a)}.

The FSTP-test1 prompts the user to input, for CI/TT0^{2.c)} from doc0, ■) its “CI- elements, X0n” , 1≤n≤N, ■) their by mathematical predicates modeled compound inventive concepts BAD-crC0n, ■) as many elementary inventive concepts BED-crC0nk as it is able to identify^{2.a)} 1≤kn≤Kⁿ, K:=∑_{1≤n≤N}Kⁿ, which define CI’s sole^{2.c)3.a)} set S={s^k | 1≤k≤K} – therein identified all BAD-crC0n* & BED-crC0k* subject to a patent-noneligibility exemption – and ■) all justifications prompted for on lines 1)(b)-4) in FIG 2. After clarifying the above quoted notions, the RS and FSTP-test9/10 –though relevant^{2.b)} – no longer need additional clarification, here [182].

D.1: $S^R ::= \{\forall s^{Rv}\} ::= \{\forall \langle s^{Rv1} \in TS(s^1), \dots, s^{RvK} \in TS(s^K) \rangle\}$ is called **“TT0-REALIZATION SET”** iff $\forall s^{Rv}$ the **“s^{Rv}-embodiment, TT0^{sRv}”** is disclosed by TT0’s specification.^{2.a)3.c/d)}

LEMMA: For TT0 – by the independency of its BED-inC0kn by FSTP-test3 – holds $S^R \cong \prod \forall s^{Rv} s^{Rv} \cong_{3.c)} \prod_{1 \leq k \leq K} TS(s^k) \cong \prod_{1 \leq n \leq N} \prod_{1 \leq kn \leq K^n} TS(BED-inC0kn)$.

³ .a) But these also are the simplest answers – hence, potentially too rigorous in practical cases. As soon as \exists precedential decisions, deviating from this rigor, the following definitions may need marginal modifications – fortunately changing nothing of principal significance, as recognizable today already^{3.a)v)}.
 Five notes concerning abbreviations (used below as already in [183]) and the precision ahead:
 i. The index “**FFOLLIN**” is omitted here, as in the FSTP-Test after its preamble. But it should be kept in mind: The below insights apply to many other Intellectual Property Laws/Regulations, too.
 ii. Throughout this paper is assumed, a CI has just 1 interpretation/Generative Set, S^o/TT0 [58]. This restriction may be dropped by applying the FSTP-Test to all finitely many TT0s alias S’s of CI.
 iii. Some sloppy wordings of [183] are fixed. Note also: Talking about TT0’ assumes TT0 \exists already.
 iv. For preciseness, definitions – abbr. by **D.i**, i=1,2,... – use (basic) Mathematics.
 v. Independently of risks with future SPL precedents, scientifically the here defined answers are well defined and hence will prevail – potentially identifying the difference to SPL precedents.
 .b) FOL enables: $\forall n \in [1, N] \wedge \forall k \neq k' \in [1, K^n]$ holds $BED-inC0kn \neq BED-inC0k'n$. Also the simplification is assumed that, if \exists several BED-inC instantiations in an s^{Rv}, they all have the same value. Due to all sets’ finity, all suchⁱⁱ⁾ simplifications are removable by expanding the FSTP-Test to remain exhaustive.
 .c) By appropriate inC limitations, the set equality “ \cong ” may be preserved also if some s^{Rv}s are not disclosed, i.e. are $\notin S^R$ – whereby this reduced S^R evidently represents a TT0 \neq TT0^{6.a)}, see **D.2-D.5**. I.e.: In spite of the independency of TT0’s BED-inCs^{2.a)}, the definitions of their TSeS may impact on each other.
 .d) Analogous terms/notions S^R, s^{Rv}, $\prod_{1 \leq k \leq K} TS(s^k)$ are used also for a TT0’, which need not pass the FSTP-Test (e.g. because there is no TT0-alike TT0’ specification or inC definition), i.e. for which only little of TT0 holds – whereby in any D.i its TT0’ notions are used like TT0 notions.

D.2 “SCOPE(TT0)”: S^R is called “**scope(TT0)**”, resp. “**scope(CI)**” iff \exists only 1 $TT0^{3.a)}$.

This is the first time that this fundamental notion of SPL – the scope of a TT0 – is **precisely** defined. Hitherto, namely nobody had developed the notion of a TT0’s “realization set”^{D.1}, being its “**protected embodiments set**” – decisive for TT0’s alleged infringement^{D.5}. If for an s^{Rv} the TT0 specification discloses of its $TT0^{s^{Rv}}$ for the posc no enablement, then it is impossible to justify in FSTP-test⁵ this S satisfies SPL – as this were the just indicated legal error – and measure^{3.c)} is to be taken.

In “classical” claim interpretation/construction [183] thus hitherto a legal deficiency was principally absolutely unavoidable: To assess TT0’s enabling disclosures by its specification not of all but just of a few TT0 embodiments – assuming the posc then would understand them all, without being capable of saying, what for TT0 exactly this “all” would comprise!!! This question arises in any infringement dispute and could hitherto never be answered precisely – **quite principally!!!**

This also caused the “overclaiming” problem of a CI – meaning that its claim is disclosed “overbroad”, thus being strong in talking a similar invention into infringing it, but untenable in its defense against its nullification as deficient as to its complete enablement. This now is easily avoidable by obeying: $\text{scope(CI)} = \{\forall TT0^{s^{Rv}}\}^{3.c)}$.

Legally, $S^R(TT0)$ is the scope of TT0’s protection by patent law if and only if (“**iff**”) TT0 has passed the complete FSTP-Test^{2.a)} – otherwise scope(TT0) is not defined at all, and there is no protection for TT0 by patent law. ^{2.a)4.a)}.

D.3 “TT0’ = TT0”^{4.b)}: A TT0’ is called to be “**equal, ‘=’**” to TT0 iff $S^{R'}=S^R$.

D.4 “TT0’ \in SCOPE(TT0)”^{4.b)}: A TT0’ is called to “**belong to scope(TT0)**” iff
 $TT0'$ passes the FSTP-Test $\wedge S^{R'} \subseteq S^R$.

D.5 “TT0’ VIOLATES TT0” A $TT0' \notin \text{SCOPE(TT0)}$ is called to “**violate**” TT0 iff
 $S^{R'} \cap S^R \neq \Phi^{4.c)}$.

D.6 “TT0 IS DEFINITE”^{4.d)}: A TT0 is called “**definite**” iff it passes the FSTP-Test.

Finally: from D.4 \wedge D.6 trivially follows: $TT0' \in \text{scope(TT0)} \Rightarrow TT0'$ is definite. ^{5.a)}

⁴ .a TT0, $TT0' \in \text{FFOL} \Rightarrow |S^R|, |S^{R'}|$ are finite, i.e. for both there is no FSTP-Test termination problem.
 .b It were false to conclude, in D.3, $TT0' = TT0$, just because $\prod_{1 \leq k \leq K} TS(s^k) = \prod_{1 \leq k \leq K} TS(s^k)$, i.e. without verifying that TT0’ passes also the whole FSTP-Test, as $\exists TT0 \wedge \exists TT0' \notin \text{scope(TT0)} : TT0'$ meets this “product = requirement”. E.g., $\{s^k\}$ need not be independent or well-defined over posc, i.e. not meet FSTP-test^{3/-test4}.
 It were false to conclude, in D.4, $TT0' \in \text{scope(TT0)}$ just because $\prod_{1 \leq k \leq K} TS(s^k) \leq \prod_{1 \leq k \leq K} TS(s^k)$, i.e. without verifying that TT0’ passes also the whole FSTP-Test, as $\exists TT0 \wedge \exists TT0' \notin \text{scope(TT0)} : TT0'$ meets this “product \leq requirement”. E.g., for some TT0 simply define TT0’ by removing from S^R an s^{Rv} , as discussed above^{3.c/4)}.
 .c In D.5 suffices already: $\exists s^{Rv} \in S^R \cap S^{R'} \wedge TT0'$ not passes the FSTP-Test^{3.d)} $\Rightarrow TT0'$ violates scope(TT0) .
 .d This “TT0 is definite” definition D.6 is equivalent to *Biosig’s*, but needs no unknown CIs (like *Biosig* does). I.e.: A TT0’s definiteness test is part of TT0’s FSTP-Test, i.e. comes for free. The conclusion is, the *Biosig* test is equivalent to the FSTP-Test, but just declarative, i.e. not operational, as the FSTP-Test. A (nontrivial) equivalence proof is: By D.4 holds: $TT0' \in \text{scope(TT0)} \Leftrightarrow TT0'$ passes the FSTP-Test $\wedge S^{R'} \subseteq S^R$.

SPL box (e.g. 35 U.S.C)

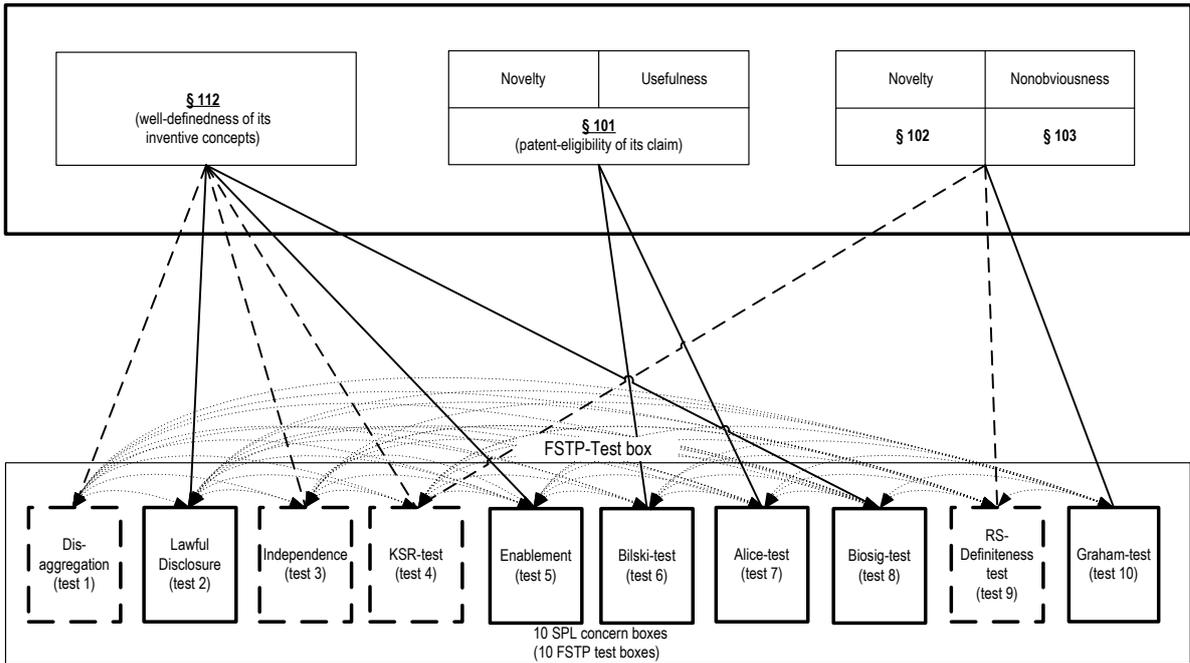


FIG 1

Bold lines show the classical claim construction's test.i's, dashed ones what *Mayo/Biosig/Alice* additionally require (refined claim construction). "←" show a "use hierarchy" among test.i's. "→" expand it to test.i's total dependency.

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The **FSTP^{FFOLLIN}-Test** is a computer implemented method – defining also a system – for testing

- under a given Finite First Order Logic Legal Invention Norm, **FFOLLIN**, a given Claimed Invention, **CI^{FFOLLIN}**, which has a given interpretation **TT0^{FFOLLIN}**, represented by its Generative Set of **TT0^{FFOLLIN}**, **S^{FFOLLIN}**,
- **TT0^{FFOLLIN}** – defined by $S^{BADFFOLLIN} ::= \{BAD-crC0n^{FFOLLIN} | 1 \leq n \leq N\} \wedge S^{FFOLLIN} ::= \{BED-crC0kn^{FFOLLIN} | 1 \leq n \leq N : BAD-crC0n^{FFOLLIN} = \wedge_{1 \leq k \leq Kn} BED-crC0kn^{FFOLLIN}\}$,

whether this **FFOLLIN** is satisfied by **TT0^{FFOLLIN}** alias **S^{FFOLLIN}**,

- whereby **FFOLLIN** is defined to comprise a conjunction of 10 given **FSTP^{FFOLLIN}-test.o** of **TT0^{FFOLLIN}** alias **S^{FFOLLIN}**, i.e. $\wedge_{1 \leq o \leq 10} FSTP^{FFOLLIN}\text{-test.o}$ – for brevity in the sequel the index "FFOLLIN" being omitted, any FSTP-test.o abbr. by just "o)", $1 \leq o \leq 10$, and for $6 \leq o \leq 10$ the stereotypic "over model and posc" omitted –

whereby the claimed invention for any **TT0** prompts the CI's user to input to it

- the given information $\blacksquare \forall TT0\text{-elements } X0n \text{ of } TT0, 1 \leq n \leq N, \wedge \forall \text{ binary abstract and elementary disclosed creative concepts of all } X0n, BAD\text{-}crC0n \text{ resp. } BED\text{-}crC0n \blacksquare$ for $|RS| > 0$ also $\forall TTI\text{-}(dummy)\text{-elements } Xin \text{ peer to } X0n, 1 \leq i \leq |RS| \wedge 1 \leq n \leq N, \wedge \forall \text{ binary abstract and elementary disclosed (dummy)\text{-}creative concepts, } crCin, \text{ of all (dummy)\text{-}elements } Xin, \text{ called } BAD\text{-}crCin \text{ resp. } BED\text{-}crCin, \text{ as well as } \blacksquare \forall$ below justifications, by stepwise prompting, i.e., for testing the **S** input to it as follows:

- 1) (a) $S^{BAD} ::= \{BAD\text{-}crC0n | \forall 1 \leq n \leq N\}$, $S ::= \{BED\text{-}crC0kn | 1 \leq n \leq N : BAD\text{-}crC0n = \wedge_{1 \leq k \leq Kn} BED\text{-}crC0kn\}$;
 (b) $justof^{\forall 1 \leq n \leq N}$: **BAD-crC0n** is **definite**;
 (c) $justof^{\forall 1 \leq n \leq N \wedge \forall 1 \leq k \leq Kn}$: **BED-crC0kn** is **definite** $\wedge \forall$ patent-noneligible **BED-crC0kn*** are identified;
 (d) $justof^{\forall S^{BAD}US}$: **BAD-crC0n** = $\wedge_{1 \leq k \leq Kn} BED\text{-}crC0kn$;
- 2) $justof^{\forall S^{BAD}US}$: $se \in S \wedge BAD\text{-}crC0n \in S^{BAD}$ are **lawfully disclosed**;
- 3) $justof^{\forall S^{BAD}US}$: **Independence-test passed** S is well-defined & independent over model;
- 4) $justof^{\forall S^{BAD}US}$: **KSR-test passed** S is well-defined over posc;
- 5) $justof^{\forall S^{BAD}US}$: **TT0's implementation by S is enablingly/lawfully disclosed**;
- 6) $justof^{\forall S^{BAD}US}$: **Bilski-test passed** TT0 is non-preemptive;
- 7) $justof^{\forall S^{BAD}US}$: **Alice-test passed** TT0 is patent-eligible;
- 8) $justof^{\forall S^{BAD}US}$: **Biosig-test passed** TT0 is definite;
- 9) $justof^{\forall S^{BAD}US}$: **RS-Definiteness-test passed** RS is well-defined over TT0;
- 10) $justof^{\forall S^{BAD}US}$: **Graham-test passed** TT0 is patentable.

FIG 2:

The **FSTP^{FFOLLIN}-Test**, the passing of which is necessary and sufficient for a CI's **TT0** to satisfy **SPL**

III. PRECISELY DEFINING THE NOTIONS OF "PREEMPTIVITY" & "NATURAL PHENOMENON" & "ABSTRACT IDEA" & "PATENT-ELIGIBILITY"

D.7: Induced by *Mayo* let, for a TT0's CI-element, the term "**improvement-prone, ip**" denote a new "property category" for its inC(s), modeled as its(their) "ip-inC(s)". Compared to such an inC, its new ip-inC property is: It is already 'visible' that it will "improve" in its domain and/or its TS, no matter whether predictably in time or not.

Of any CI and/or its inC(s), this definition of an ip-inC enables precisely modeling its/their natural phenomenon or abstract idea "(property) **category**"^{6.b}) – so the *Alice* term^{5.b}). In principle, both categories make its CI preemptive – introduced in *Bilski/Mayo/Alice* and modeled below – i.e. they may be seen as categories of such "ip-CIs" exemption from patent-eligibility^{5.b}). This definition of ip-inCs yet enables them to themselves avoiding preemptivity and hence patent-noneligibility of the CIs embodying them (i.e. in their Generative Sets) – as explained below.

ip-CIs' specifications need not disclose enablements for their future potential improvements their ip-inCs model. I.e., for an ip-CI having its FSTP-Test would not perform FSTP-test⁵ for the improvements of its ip-inCs over their original inCs.

The ip-inCs' capability to precisely identify, right from the outset of applying for a patent for a CI its potential future improvements, evidently shall provide a clean framework for implicitly conveying, with this actual application, a preliminary patent application for the improved respective CI – as outlined below in some detail. The similar but less precisely defined effect has hitherto been achieved by simply mentioning potential future CI improvements in its specification. If this mathematical modelation framework is socially felt as being too narrowing, it may be pragmatically relaxed – then tolerating some preemptivity by SPL precedents using it. (!!)

Two currently broadly discussed ip-inCs – though not so termed:

- 1.) In the Supreme Court's *Myriad* decision the "BRCA" TT0 has a single CI-element (representing a specific chromosome of the human genome) and its single inC – an aspect of this chromosome modeled by domain(inC)– models, by its TS(inC), "a huge range of 'certain nucleotide sequences'". R&D will visibly but unpredictably in time improve, e.g. TS(inC). Hence, this inC is a natural phenomenon ip-inC.
- 2.) In *Alice*, its "Closing" CI-element of its "transaction settling" TT0 today has only a single inC ("automatically in the evening"), but its TS will utmost likely but unpredictably improve over time in response e.g. to customer demands (for an additional "close on request instantly", ...). Hence, this inC is an abstract idea ip-inC.

D.8: For an $s \in S$ and an s^o let be defined \blacksquare) the relation " $s^o > s$ " iff $\text{domain}(s) = \text{domain}(s^o) \wedge \text{TS}(s^o) \setminus \text{TS}(s) \neq \Phi$, and \blacksquare) as meaning of " $s = \text{ip}$ " to be that s is an "ip-inC".

D.9 “PREEMPTIVITY” by *Bilski*: TT0 is called “preemptive” iff $\exists \text{TT0}' \neq \text{TT0}$ passing the FSTP-Test: $\text{scope}(\text{TT0}') \cap \text{scope}(\text{TT0}) \neq \Phi \wedge \exists k \in [1, K]: (s^k > s^k) \vee (s^k = \text{ip})$ ^{5.b}.

D.10 “ABSTRACT IDEA” by *Bilski*: TT0 is called an “abstract idea” iff $\exists \text{TT0}' \neq \text{TT0}$ passing the FSTP-Test: $\text{scope}(\text{TT0}') \cap \text{scope}(\text{TT0}) \neq \Phi \wedge \exists k \in [1, K] \nexists k': (s^k > s^k) \wedge (s^k = \text{ip})$ ^{5.d}.

This definition of the abstract idea property of a TT0 tells that it is patent-eligible as preemptive, its preemptivity yet is not caused by a natural phenomenon. Thus, despite of much phony adverse rumor about the Supreme Court’s notion “abstract idea” of a TT0: Its meaning is absolutely clear and very reasonable!

⁵ **.a** D.1 introduced a notion reflecting the “scientific standard procedures” in analyzing a problem, it is the SPL-specific analog notion to the well-known notion of “state-diagram“, common to all exact sciences.

D.2- D.6 introduced notions mirroring alias modeling the basic scientification impacts of the above quoted Supreme Court decisions on SPL precedents, indispensable for enabling it to consistently dealing with ET CIs. These notions are basic in that they deal with terms having semantics, which – also that of “inventive concepts, inCs” – ought to have been known in the pre-*Mayo/Biosig/Alice* era, already.

The fact that they have not been clarified earlier by SPL precedents tells that it hitherto has not been subject to the scrutiny of scientific analysis – although the Supreme Court by its above quoted decisions repeatedly asked for it.

D.7- D.14 precisely define further notions indispensable for enabling SPL precedents to consistently deciding on ET CIs in the light of the terms/notions of this Sections’ headline. Their semiotics also models scientification impacts of the above quoted Supreme Court decisions on SPL precedents [171].

This paper considers the semiotics alias “SPL precedents new meaning making” for the terms/notions “ip-inCs” and “tw-inCs” introduced by **D.7** (enabling clarifying the notion of “preemptivity” and “abstract idea”) resp. **D.11^{5.b}** (on this basis enabling clarifying the notion of “patent-eligibility” and better understanding the “substantial more, >>” relation^{5.e}) – and models them all mathematically, except the >>-relation, of which here only its structural characteristic is tentatively put forward.

Applying this mathematical scrutiny of **D.1-D.14** – to the *KSR/Bilski/Mayo/Biosig/Alice* framework – is really awarding, as shown by the many fundamental and unquestionable new insights thus gained into the emerging areas “Innovation-R&D” and “Innovation Mathematics”. It is totally unlikely they ever were achieved by just reasoning in natural legal language about therefore poorly defined SPL issues.

.b This equality insinuating sentence makes sense only on the level of notional resolution, where the BED-inCs are seen as meaningful. If this level of abstraction is somewhat reduced – for seeing how their mirror predicates on some appropriately defined spaces would define the BED-ip-inCs and their improvements – one sees that both kinds of preemptivity generating inCs are unequal: In both cases the BED-ip-inCs’ mirror predicates are defined on at least 2-dimensional spaces, 1 dimension thereof in both cases representing the respective TS(ip-inC)s components of their natural laws respectively abstract ideas.

But, the mirror predicates of a natural law property modeling and of an abstract idea ip-inC are of quite different semiotics. The former semiotics tells: Nobody is capable of today explaining the internal logic of its TS(ip-inC), i.e. it got to be understood, today, as an axiom, the reasonability of which is supported by nothing else but experience. For the latter semiotics, the internal logic of its TS(ip-inC) is clearly definable by known impacts on its ip-inC of its original TS(inC) component(s), thus enabling the inventor to reasonably justify the choices he/she takes as to this ip-inC determining its CI; this ip-inC models/represents nothing today still unknown or metaphysical^{6.a}.

.c The same applies for the distinction between the mirror predicates of the ip-inCs and tw-inCs. The examples 1.)/2.) for ip-inCs and 1’.)-3’) for tw-inCs cannot disclose the whole notional complexity embodied by the relations of these notions to the above quoted Supreme Court notions, i.e. unavoidably embodied by the innovation business with ET CIs – more completely presented by [191,182].

But this complexity should not be misinterpreted as indicating that the approach to mathematically modeling a clean and operational framework for broadly consensual SPL decisions on ET CIs – based on the very abstract and nonoperational *Mayo/Biosig/Alice* framework serving the same purpose – is just a far cry. Those familiar with science/technology developments know: This approach here presents itself as already operating on intellectually firm ground – on which we got to get ahead quite a distance.

.d As shown in **1.**), for a TT0 one of its BED-inCs may be an abstract idea, already making it an ip-TT0 (unless compensated by a tw-inC of TT0, as explained below), but also if none of its BED-inCs is an abstract idea, its TT0 nevertheless may be one by **D.10**. One might assume, TT0’s preemptivity is always avoidable by adjusting the TS(BED-inC) of TT0 appropriately. This may work for some TT0s, yet in both cases there are TT0s for which this is impossible (in *Alice* reducing its TS(ip-inC)s is simply not possible, in the other case reducing TS(inC)s such that $\text{scope}(\text{TT0}') \cap \text{scope}(\text{TT0}) = \Phi$ destroys the “>>”, see below).

D.11: Induced by *Alice*, let for an ip-TT0 the term “**transformation-warranting, tw**” denote a category of its ip-CI-element/s’ properties, modeled by “tw-inC/s” tying its ip-inC/s into a user-application, so transforming this ip-TT0 into patent-eligibility^{6.a}.

Three currently broadly discussed tw-inCs – though not so termed:

1.) In *Alice*, its specification discloses for its “transaction settling” TT0 (see 2.)) its CI-elements and ip-inCs, but none and no combination of them is “tw-inC impacted”.

2.) *DDR*’s “customer contact” CI-element has a “look&feel” abstract idea ip-inC and the – by *Alice* and accordingly by the CAFC – “customer retention” tw-inC [160].

3.) CAFC’s recent *Myriad* decision strangely ignored, of its TT0 the CI-element “cancer indicator” – in its claims’ wordings even explicitly quoted [163,183] – and its tw-inC, which makes TS(tw-inC) contain solely “BRCA1” and/or “BRCA2”^{5.c}.

D.12 “PATENT-ELIGIBLE” by *Alice*: An ip-TT0 is called “**patent-eligible**” iff $\exists \{k^*\} \subset [1, K] : \bigwedge^{k^* \in [1, K]} \text{BED-crC0k} \gg \bigwedge^{k^* \in [1, K] \setminus \{k^*\}} \text{BED-crC0k}$, whereby the “ \gg ” has the meaning “{k*} transforms the latter conjunction into a user-application”^{6.a}.

This definition of patent-eligibility might mislead to considering the CAFC’s 2014 *DDR* decision as legally erroneous, by arguing its TT0’s “customer retention” inC is in truth an ip-inC^{6.a}. But this were a legal error as, for the posc, the *DDR* specification discloses no such increase of the size of its “customer retention” domain^{6.c}.

⁶ .a The SPL semiotics of the term “X is a user-application” is: “X provides its service directly to a user” (X representing a TT0, its CI-element/s, or its/their inCs), which diametrically opposes the SPL semiotics of the term “X is a downstream-located-application” being: “X provides its service not directly to a user”.

As a consequence, for a TT0, the SPL semiotics of the term “{k*} transforms the latter conjunction into a user-application” defines its meaning to be “{k*} has a patent-eligibility generating effect for the user-application by neutralizing the preemptivity generating effect of its latter conjunction’s ip-inCs by disabling them from preempting other TT0s, i.e. making them defined for this user-application only^{5.b}”.

Accordingly – and **this insight is indispensable for understanding *Bilski/Mayo/Alice*** –

- an ip-inC models – as a property of the service its CI-element provides – a service of a downstream-located-application of this property and hence is necessarily preemptive, no matter whether it is of a natural phenomenon or an abstract idea sub-category of the ip-inC category, while
- a tw-inC models – also as a property of the service its CI-element provides – a service of a user-application of this property and hence cannot be preemptive, which enables it to bar this TT0/user-application from preempting other TT0s/user- or downstream applications’.

.b The principles of both inC main-categories^{6.a}, ip and tw – being noneligibility representing resp. excluding by “overriding” it^{5.b,6.a} (!) – are induced by above Supreme Court’s decisions as to the semiotics of refining SPL precedents for catering all parties interested in ET CIs, as *Mayo* requires. FSTP-Technology – originally designed for scientizing only the “obviousness” notion, as the BGH “*Gegenstandsträger*” decision indicated, preceding *KSR*, both reaching far into metaphysics [6⁴, 7⁴] – supports both inC categories [161]. While their semiotics are currently vividly discussed in smart but conventional legalese [195] – e.g. distinguishing between technical and non-technical TT0s – the ip/tw-inCs models avoid this distinction (as undefinable) and strive for more uniformity, as seemingly also being an *Alice* objective.

.c By its elements’ “combinations”, *Alice* allows ip- and/or tw-inCs to be BOD- or BAD- or BED-inCs.

.d In response to emerging customer requirements, TT0 improvements may lead to increasing the size of the domain of this inC and its TS – the latter from currently having the above single domain-element “customer retention” only (which by the *DDR* specification is defined as “not forwarding the customer to the Internet server of a supplier of a product if the customer clicks on this product”) – such as enabling TS(inC) to comprise also values like “keep customer id secret”, “keep all supplier ids secret”, But alike is possible with any ET CI – hence the resulting ET CIs then are considered to be separate [137]. (!)

.e see [7,64] – also emphasizing that it is unclear whether a pathological CIPFOLLIN exists, at all.

.f see [175]

Finally, for the relation “ \gg ” just used – introduced by *Alice*, initial clarifications gained by this paper and [150, 151,153,175,171] – a comment is in place: For achieving consistency in SPL precedents, a threshold common to all CIs is indispensable (at least ET sub-category wise^{6.b)}), and the least restrictive one – i.e. the one with maximal scope(ip/tw-CI) – is assumed to reflect the intention of the Supreme Court’s above quoted line of decisions^{6.a)3.c)}.

This assumption is supported by the expectation, that courts would consider later simple limitations of the TS of this ip-inC as not disclosing a nonobvious CI – without explicitly explaining the difficulties to intellectually overcome for rationally arriving at them and the advantages embodied by them, especially as this broadening and/or shrinking of the scope(CI) has been anticipated by the scope(ip/tw-CI)^{6.a)}. I.e.: The latter “pseudo-anticipation” would surely act as an “innovation catalyzer” – though this thinking requires refinement and feedback from the public.

D.13: For an ip/tw-CI, let “**scope(ip/tw-CI)**” be the modification of the S^R of the original CI as it results from the modifications of the domains and TSEs of this original CI’s inCs, first by its ip-inCs, making this ip-CI preemptive, and then by its tw-inCs, making this **ip/tw-CI** a nonpreemptive user-application.

D.14: Let the meaning of the relation “**substantially more than, \gg** ” between an ip/tw-CI and its ip-CI be: “The ip/tw-CI’s tw-inC(s) eliminate the preemptivity created by its ip-inC(s) by modifying their domains and/or TSEs such that any ip-inC is defined only for and this ip-CI is transformed into a user-application ip/tw-CI of its tw/ip-inC(s)”.

THEOREM: Any non-pathologic^{6.d)} ET-CI may be upgraded – by using the FSTP-Test – to unassailable patent-eligibility & patentability & nonobviousness^{6.e)}.

Depending on the creativity effort invested in what parts and to what extent, the scope(ET-CI) would thereby vastly controllably shrink resp. grow [136].

The preceding groundbreaking definitions, consequences, and the theorem provide hitherto unavailable scientific insights into the being of an invention/innovation^{5.a)} – in principle, since the 70s known to be precisely describable by (inventive) concepts, as now required to be used by *Mayo/Alice* – which is legally protectable by some FFOI Legal Innovation Norm (e.g. patent/copyright/trademark laws, institution/company regulations, business secrets, ...). They represent an unexpected scientification of all kinds of IPRs in all kinds of innovations – which consequentially already enabled to design and prototype a cutting edge innovation expert system (IES), opening extremely promising perspectives at all kinds of innovation business.

In total: There is no “End of the pro-patent era”, as insinuated by some [196]. The contrary is true: This era just got absolutely future-proof – world-wide.

IV. A REMAINING BIG QUESTION – BROADLY IGNORED, HENCE BRIEFLY REMINDED

This inconvenient question is neither technical, nor legal, nor political – it is purely sociological and will hit soon and hard.

Already footnote 4 of [6,7] postulated that and why FSTP-Technology – the herald of Innovation Science [182] – is a new exact technology/science located on top of elementary Mathematics and below Physics, which enables a groundbreaking type of Innovation Expert Systems, IESes [161]. Just as the motorization of physical vehicles, in the first half of the 20th century, rapidly enabled a broad mechanization of all kinds of transport activities, the computerization of intellectual vehicles will rapidly enable a broad scientification of all kinds of intellectual property rights/transportation activities. In particular, IESes will massively impact on the professional activities of in particular patent experts of any kind – though much more dramatically than motorization/mechanization has ever achieved in the world of physical transport.

The above inconvenient question then is, how this high flying prognosis for IESes – their inevitable impacts on PTOs is outlined in [163] – fits into today's professional reality, as it presents itself at such overall extremely important events like the USPTO's "Patent Quality Summit" in DC on 25.-26.03.2015.

Of this question's many facets, touched at this event, here only the most important yet vastly ignored one is addressed. It reflects that the range of patent quality issues, the USPTO must care for, is so broad that its activities have difficulties of finding a common denominator. And the same applies to the development activities of the professional profiles of its customer communities, represented by the attendees.

This most advanced kind of "digital divide" plaguing both camps, the USPTO and its customer communities, became apparent already during its first hours. The "quality related aspects of Substantive Patent Law and its currently very fast and very fundamental developments" minded participants felt evidently somewhat lost among the vast majority of participants focused on "quality aspects of the current patent eco system as it is", i.e. abstracting from such SPL developments.

The excellent main panel of this event clearly recognized this broad spread in understanding the current situation⁷⁾. In particular [192] addressed both these main streams with a strong bias towards the latter one – as seemingly expected by the audience and implicitly confirming its dominating "practitioner belief" that an abrupt demand of substantial increase in professional qualification is just not thinkable.

This sharply contrasts to the question written in huge letters on the wall and that the same persons [192] vividly emphasized elsewhere: How to disseminate, from mainstream one, the many advantages coming along with so seen ET CIs – by mainstream one (to be) derived from the Supreme Court’s above line of decisions, i.e. this substantial increase in professional qualification enabling to professionally leverage on them – to the in total hundred thousands of individuals of mainstream two⁷?

The majority’s reluctance to notice this dissemination problem of increased IPR know-how is the reluctance to notice that the society’s wealth is increasingly depending on the economical successes of ET CIs resp. of their industries, i.e. that hence the “patent eco system” must undergo a transition from its today’s pre-industrial manufacture orientation to a scientized knowledge industry – as it similarly occurred previously in agriculture, clothing, food, construction, automobile, ... eco systems, always generating losers and winners, indispensable for preserving the society’s wealth.

The decisive distinction to such earlier transitions: ET CIs’ R&D requires much higher long-term & high-risk investments than ever seen before. Due to its antiquated manufacture imprint, today’s patent eco system would fail to convince investors of ET CIs’ capability to guarantee a sound business model requiring such investments. By *Mayo*, the Supreme Court recognized this threat and put SPL precedents on ET CIs on the right track – namely on that of its scientification, as shown above – thus relieving it from this “pre-industrial stigma” and enabling it to gaining back investors’ trust.

⁷ An example of this problem is the non-discussion between both main streams about the disastrous consequences that the *Mayo/Alice* decisions originally had for many PTO examiners’ views about patent applications, in particular about those for ET CIs. And still today, their representative in this panel indicated in no way that the corps of examiners accept that the Supreme Court by these decisions – evidently stimulated by the economically rapidly increasing importance of ET CIs and the classical SPL precedents had proven not to be consistently applicable to them – had to pose these new intellectual challenges as to accordingly adjusting such ET CIs’ Intellectual Property Rights, i.e. for optimally unfolding ET CIs’ economically very beneficial potentials.

A convincing representative of a quality initiative – as to this substantially increased professional qualification – that the USPTO’s first main stream is capable of establishing is its compilation and repeated refinement of the “Interim Eligibility Guidance” (IEG) and its consensus making within this main stream in its customer camp as to this all overarching SPL precedents refinement for catering ET CIs.

Yet, listening to the contributions during only the first hours of this event was sufficient to clearly recognize that there is only little common ground with the second main stream in both camps (USPTO and customer communities) as to appreciating the advantages of this significantly higher level of SPL precedents required/stimulated by the Supreme Court and now implemented by the first main stream in both camps.

This is really problematic, as the second main stream attendees at this event are the best informed representatives of this huge crowds in both camps. Their members hence must be estimated to be even more reluctant to accept that there is a challenge in their business life, which they got to master – and indeed can, as the IEG initiative shows. Though, at the expense of some unavoidable intellectual training, requiring some true efforts.

Thus, while the reception of this IEG is just the initial step to this higher level of professional qualification required in dealing with ET CIs – as shown by the CAFC’s preceding experience of needed notional preciseness and the respective vogue of definitions and insights – it yet is also the most cumbersome one just as fortunately the most promising and eventually awarding one, as shown by the IES.

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*FSTP = Facts Screening/Transforming/Presenting
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