

Advance Reward Guidelines

The Innovation Game

Introduction and Theory

- **Method:** Refers to a discrete algorithmic method that is a finite, abstract, and well-defined sequence of steps or operations, formulated to solve a specific problem or compute a result, independent of any programming language or execution environment. A code implementation of a Method, by contrast, is the realization of that Method in a specific programming language or system. For instance, two implementations of Dijkstra's method in C++ and Java might differ in syntax and performance quirks, but they would still embody the same core method.
- **Technical Effect:** Refers to a technical effect resulting from execution of a Method. A technical effect must be observable as a real, tangible change in a technical system or process. The normal physical interactions between a program and computer are not considered to be a technical effect. To be technical an effect must result in a concrete, physical, or functional change in the real world.
- **Advance Rewards:** Refers to the tier of rewards that are available in The Innovation Game for Methods which have been voted as eligible for such rewards by a vote of TIG token holders.
- **Advance:** Refers to a Method that is eligible for Advance Rewards.
- **Advance Evidence Template:** Refers to the template designed to prompt and support the submission of evidence relevant to the assessment of a Method for Advance Rewards by TIG token holders.
- **Prior Art:** Refers to any evidence that an invention or idea was previously known or publicly available. It includes previously published patents, scientific articles, products, public demonstrations, or any other disclosure that proves that the idea is not new. If prior art exists, it can be used to challenge the novelty and patentability of an invention.
- **Novelty:** In the context of patents, refers to the requirement that an invention must be new and not previously disclosed in any form. An invention lacks novelty if prior art exists that describes the same invention or a very similar or obvious one. Novelty is a fundamental criterion for patentability, ensuring that only genuinely new inventions receive patent protection.
- **Inventiveness:** Also known as **non-obviousness** (see Obviousness below), is a key requirement for patentability. Inventiveness requires that an invention must involve an **inventive step** – it must not be obvious to a person skilled in the relevant field based on existing prior art. An invention lacks inventiveness if someone with ordinary knowledge in the field could easily deduce it from existing technologies or publications. This requirement prevents patents from being granted for trivial improvements or predictable modifications of known solutions.

- **POSITA:** Refers to a "Person of Ordinary Skill in the Art". This is a hypothetical individual presumed to have ordinary knowledge and skills in a specific technical field at the time of an invention. The POSITA standard is crucial in evaluating patent applications, particularly when assessing an invention's obviousness or inventive step. If an invention is deemed obvious to a person of ordinary skill in the art based on prior art, it may not qualify for patent protection. The concept of POSITA serves as a benchmark to ensure that patents are granted only for genuine innovations that are not readily deducible by someone with ordinary skills in the relevant field.
- **Obviousness:** (also called "**lack of inventiveness**") is a patent law concept that determines whether an invention is too predictable or straightforward based on existing prior art. An invention is considered **obvious** if a POSITA could easily arrive at it by combining or modifying existing knowledge. If an invention is deemed **obvious**, it does not meet the **inventive step** requirement and cannot be patented.
- **Unexpected Result:** means a result which to a POSITA would be unexpected. Evidence of an unexpected result can be useful to demonstrate that the method producing the result is non-obvious. In the context of The Innovation Game an unexpected result for Methods in Categories A or B [see Slide 14] we believe should indicate performance, for a relevant metric, that is **meaningfully useful** relative to the SOTA method (we suggest equal to or greater than 50% of the performance of the SOTA method). This recognises the latent performance potential inherent in methods comprising, at least in part, of previously unseen material. For methods in Categories C, D or E [see Slide 14], which do not embody previously unseen material, an unexpected result requires relatively higher performance relative to the SOTA method (we suggest benchmark results that are greater than or equal to the performance of the SOTA method for a relevant metric).
- **Field:** In the patent context, field refers to the specific area of technology or industry to which an invention belongs; it includes the knowledge, techniques, and practices commonly understood by a POSITA in that field. In the context of The Innovation Game, field refers to the area of technology or industry nominated by the submitter of the relevant Method in accordance with the TIG Advance Reward Guidelines which will be used to define the the knowledge, techniques, and practices commonly understood by a POSITA. The relevant Field will be the technical field to which the technical effect relates e.g. the technical effect of higher image resolution would sit in the technical field of image processing.
- **Test Datasets:** In the context of **algorithms**, **test datasets** are standardized collections of data used to evaluate, compare, and validate the performance of algorithms, particularly in fields including but not limited to machine learning, artificial intelligence, and data science.

These datasets serve as a **common reference point** to measure:

- **Accuracy** and **efficiency** of algorithms
- **Generalizability** across different scenarios
- **Fairness** and **bias** in decision-making models
- Benchmark datasets help researchers and developers assess how well an algorithm performs compared to existing methods. Examples include; For Knapsack: Group I, Group II, and Group III QKP instances link: <https://leria-info.univ-angers.fr/~jinkao.hao/QKP.html>; For Vehicle Routing: Solomon or Gehring & Homberger benchmark instances. Link: <https://www.sintef.no/projectweb/top/vrptw/homberger-benchmark/>

General Guidance

- It is the Method itself, **not** the implementation of the Method, that will be the subject of the assessment by TIG token holders to determine eligibility for Advance Rewards.
- Always maintain an awareness of Token Holder voting considerations when completing the **Advance Evidence Template**. You can read the guidance that TIG provides to Token Holders in the "**Advance Rewards Guide for Token Holders**". Ultimately, Token holders will decide whether the **value added** to the TIG token by a proposed Method is sufficient to merit eligibility for Advance Rewards. If you conclude, yourself, that the Method is unlikely to be assessed as one which will add value to the TIG token then you should consider carefully whether you wish to proceed with submitting it to a Token Holder Vote.
- A Method should only be voted as eligible for Advance Rewards if it **adds value** to the Protocol. An obvious way by which value may be added to the Protocol is by the Method being patentable and that is why the Guidelines place some emphasis on novelty, inventiveness and technical effect. However, patentability is neither a necessary or sufficient requirement and there may be cases where a Token holder may reasonably conclude that value will be added even if the Method is not patentable, or cases where even though the Method is novel and inventive it is deemed not to add sufficient value.
- For Methods in Categories A and B [See Slide 14], we believe commercial value is more likely to be present because Methods in these Categories embody new material not seen before in the Field and this can provide a new starting point for further innovation and optimization and greater potential for spillover value. Accordingly, we set the performance threshold guideline for inventiveness lower for these Categories.
- **Supporting evidence** submitted by you, as recommended by these Guidelines, could make the difference between a Method being voted as eligible for Advance Rewards or not.

Method Assessment

- **STEP 1:** Identify any **Technical Effects** [See Slide 6] of executing the Method.
- **STEP 2:** Identify the **Field** in which the Method is to be assessed for inventiveness [See *Slide 7*]
- **STEP 3:** Search for and identify **Prior Art** that may impact novelty and inventiveness.
- **STEP 4:** Consider **Novelty**. Establish the novelty of the proposed Method.[See Slide 8]
- **STEP 5:** Benchmark your Method using the **Test Datasets** [See *Slide 9*]
- **STEP 6:** Consider **Inventiveness** [See *Slides 10-16*]

Technical Effect

- **Technical Effect** is a term often used in patent law, especially when assessing whether something involving software or algorithms is patentable. A technical effect goes beyond just running an algorithm; it's about the algorithm causing a real, tangible change in a technical system or process.
- **Examples of technical effects:**
 - Reducing the time that it takes for a computer to process data.
 - Improving battery life through smarter data management.
 - Enhancing image processing in a camera for sharper photos.

So, a technical effect usually means the invention solves a technical problem using technical means.

- Patent offices generally consider the mere execution of an algorithm on a computer to be abstract or non-technical. It's treated as:
 - A mathematical method (which is excluded from patentability by itself), or
 - A generic computer implementation, which lacks technical character.
 - So just saying *"here's an algorithm, and it runs on a computer"* doesn't make it patentable.
- Identifying the Technical Effect of your Method will help you identify the relevant Field for your Method.
- Your Method may be capable of achieving more than one technical effect and, in such circumstances, you should choose a single technical effect for the purposes of determining the Field that you nominate but also communicate any additional possible technical effects of which you are aware in the relevant section of the Advance Evidence Template.
- **IMPORTANT:** As noted before [see Slide 4], patentability is neither a necessary or sufficient requirement of eligibility for Advance Rewards and, as a component of patentability, the identification of a Technical Effect is neither a necessary or sufficient requirement for eligibility for Advance Rewards either.

Field

- Identifying the relevant **Field** has important implications for the assessment of **inventiveness** of your Method because it is used to define the knowledge, techniques, and practices commonly understood by a POSITA.
- You may only nominate a **single** area of technology or industry for consideration by TIG Token holders and it should be the area of technology or industry in which the Technical Effect of your Method is most relevant.
- Where there are multiple fields in which your Method may be applied you should choose the field which you think will have the highest chance of passing the Token Holder Vote and explain the value that you think it adds to your chosen Field. You should also list the other fields that you considered to be relevant but did not select as your chosen Field.
- Where you are not able to identify an area of technology or industry other than the relevant mathematical field of the Method itself (i.e. you are not able to identify a technical effect), then you should declare that, and simply identify as the "Field" the relevant field of mathematics to which the Method belongs.

Novelty

Novelty in the context of algorithmic methods can take various forms:

Novelty in the Method itself, either because it is all new material or a new combination of existing methods

- To be novel the **Method** must **not have been identically disclosed** in a single prior art reference. If *anyone* has already made or publicly disclosed the exact same Method, then it will not be novel. [**Category A and Category E**]
- A **combination** of prior art can be new. A Method can be novel even if it is a composition of prior art material, if the combination of that prior art material has not been seen before in a single prior art reference. [**Category B and Category D**]

Novelty for a Method in patent law is therefore established by an analysis of whether the Method has been seen before or not. Creating a Method that is novel should, therefore, be relatively trivial - you just need to make sure the Method is not already publicly disclosed in identical form.

Novelty in the way that the Method is applied to create a Technical effect

- An **application** of the Method can be novel, even if the Method itself is not novel, if you are applying that Method to a *new problem* in a way that hasn't been done or disclosed before (i.e. applying the Method to produce a new Technical effect for that Method). For such cases you should alert the Token Holder that will be voting, to assess the novelty of the application of your Method and not the Method itself **Category C**]

Test Dataset Benchmarking

- For each challenge TIG will suggest standard test datasets for benchmarking your Method.
- As an expert in either or both, the challenge which your Method solves, or the Field which you selected, you may suggest supplementary Test Datasets which you believe will be helpful towards persuading a Token Holder to vote in favour of the eligibility of your Method for Advance Rewards.
- Results obtained from benchmarking using the Test Datasets are important when determining whether the Method produces an **Unexpected Result**.

Inventiveness

- **Inventiveness (Non-obviousness)** requires that the Method represents an inventive step beyond what is already known.
- Even where a Method is novel, it will not necessarily be inventive. Something can be **novel but still obvious**, and therefore **not patentable**. All Methods, whether they are entirely new, a new combination, or an existing method applied in a new way, will be subject to a test of obviousness to determine their patentability.
- **Even a completely novel invention**, meaning it has never existed before and is not a combination of known elements, can still be considered "obvious" to a POSITA under patent law.
- The question to answer to determine if the Method is inventive or not is whether the difference between the Method and prior art would have been **obvious at the time** of the invention to a POSITA ?
- It is important to note that you, as an inventor, are not a POSITA; you are allowed an inventive capability that is not afforded to a POSITA. So, be careful not to conclude that if the Method is obvious **to you**, that it would also be obvious to a POSITA.

Inventiveness and Algorithmic Methods 1

To **argue your Method is *not* obvious**, you should, to the extent you are able to, submit evidence of:

1. Technical Difficulty or Unpredictability

- Is your Method doing something in a way that wouldn't have been an obvious choice to a POSITA?
- Did it involve overcoming non-trivial challenges that required insight?

2. Surprising Results or Improved Performance

- Does it yield **unexpected** improvements (e.g. better accuracy, speed, efficiency)?
- Can you quantify that gain in a meaningful way?

3. Teaching Away in Prior Art

- Did prior work suggest that your approach *wouldn't work* or wasn't the best direction?

4. Long-Felt Need / Industry Adoption

- Has the field struggled with this for a while, and you solved it?
- Is there evidence that your method has the potential to see commercial success or wide adoption?

Inventiveness and Algorithmic Methods 2

- Would a POSITA, facing the same problem, have been **motivated** to try your solution, and reasonably have expected it to work?
 - If **yes** then your Method is possibly obvious.
 - If **no**, or if there was uncertainty or ingenuity required then your Method is potentially *non-obvious* and patentable.
- The POSITA is presumed to:
 - Know all relevant prior art.
 - Apply common sense and standard techniques.
 - Be motivated to improve, optimize, or explore alternatives.
- So, even if your Method is **completely new**, if a POSITA would find it a **logical or predictable development**, it may still be considered obvious.
- Obviousness doesn't always rely on combining multiple prior art references. Even **a single reference** can render the Method obvious, especially if:
 - The prior art **suggests a clear path** to the Method.
 - The Method is a **predictable improvement** (e.g. increasing speed, using a stronger material, etc.).
 - The Method results from applying **routine experimentation** or **design incentives** known in the field.
 - There's a **reasonable expectation of success** for someone trying a certain modification.

Inventiveness and TIG

- TIG looks for novelty, inventiveness and a technical effect for a submitted Method as some of the key indicators of whether the Method may add value to the TIG token.
- Depending on the nature of the Method, there is a varying degree of additional evidence that is likely to be necessary to support a finding of inventiveness. We believe it is useful to filter methods for inventiveness by assessing the source of the Method and the extent to which the Method delivers an **Unexpected Result**.
- For **Categories A and B** [see Slide 15] we believe that performance of equal to or better than 50% of the SOTA method is indicative of an Unexpected Result.
- For **Categories C, D and E** [see Slide 16] performance equal to or better than the SOTA method is deemed necessary for it to be indicative of an Unexpected Result.
- The performance guidelines set out above are not thresholds, and you can submit your Method and argue that it is inventive even if the performance does not accord with these guidelines.
- There is a relationship between the commercial value or utility of a Method and whether the Method is likely to be inventive. If a new Method is commercially valuable or has utility, then it is more likely to be inventive because the commercial value or utility provides a source of motivation for the creation of the Method which a POSITA would be assumed have responded to already if it was obvious to do so.
- The most obvious commercial value or utility will be an improvement over the SOTA. This can be demonstrated by benchmarking using Test Datasets. However, there may be utility even if the Method does not improve on the SOTA method; for example, if the Method is the next best **non-infringing** alternative to the SOTA method because it will be openly available, in contrast to the current SOTA method.

TIG Inventiveness Guide Based on Result Expectation

LOW

Results from Test Datasets **less** than
50%
of the performance of the SOTA method

HIGH

Results from Test Datasets show
improvement over SOTA

Required performance of the Method to demonstrate evidence of Unexpected Result

A

Method based
wholly on material
not
previously seen
before, or not
seen in the Field

B

Method based on
a **combination** of
prior art seen in
the Field with prior
art from outside the
Field

C

Method based on prior art
seen in the Field with a
suggested **Technical Effect**
seen in the Field but
where such Technical
Effect has not been
previously associated with
the Method

D

Method based on
a combination of
Prior art seen in the
Field **combined**
in a new way

E

Method incorporates prior
art seen in the Field
applied in a new way
within the Method

Supporting Evidence for Inventiveness Categories A and B

Categories A and B involve at least some material and/or information assumed **not** known by a POSITA

New Method or Method new to Field (Category A): The newness of the Method or novelty in the Field should make overcoming obviousness relatively easy providing the Method solves the problem with a reasonable level of performance. If a method offering a reasonable level of performance would be obvious to a POSITA then they would likely have already tried it and the fact that they haven't suggests it is therefore not obvious. Relevant evidence will therefore be an **Unexpected Result** (we suggest equal to or greater than 50% of the performance of the SOTA method) from benchmarking.

Combination with Prior Art from outside the Field (Category B): You should provide evidence that it would not be obvious for a POSITA to discover the Prior Art from the other field and combine it with Prior Art in the Field. You should also provide supporting evidence of commercial value or utility; the more evidence of this that you can provide the less likely it will be that the combination will be deemed to be obvious (commercial value or utility provides a source of motivation for the creation of the Method which a POSITA would be assumed have responded to already if it was obvious to do so). Evidence of an **Unexpected Result**, as above, will be relevant for Methods in this Category too.

Supporting Evidence for Inventiveness Categories C, D and E

Categories C, D and E involve material and information assumed known by a POSITA

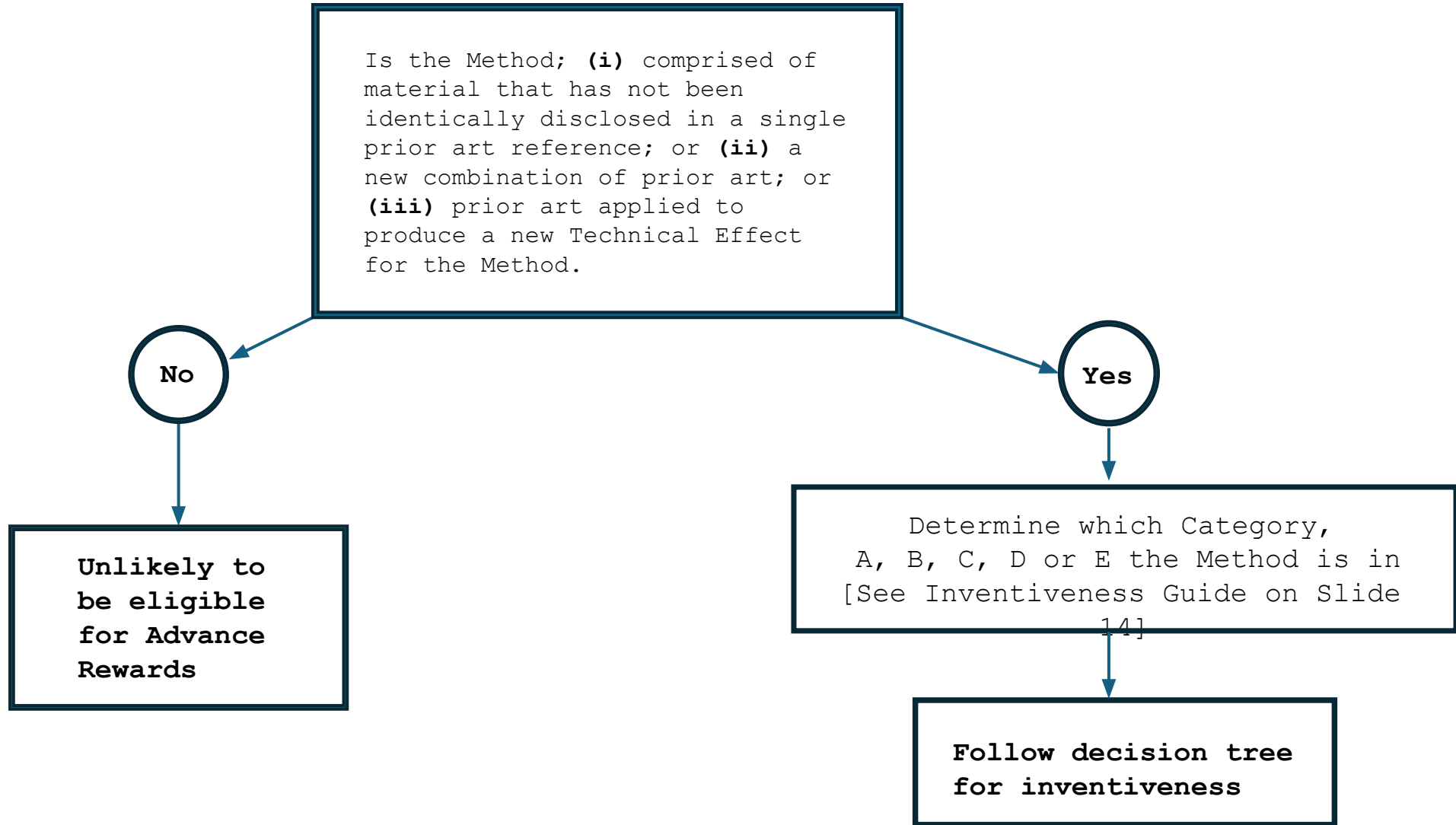
Method based on prior art seen in the Field applied to produce a Technical Effect also seen in the Field but not previously associated with the Method (Category C): A POSITA will be deemed to have knowledge of the prior art in the Field and the nature of the Technical Effect. You should provide evidence that it would not be obvious for a POSITA to achieve the Technical effect using the Method. You should also provide supporting evidence of commercial value or utility; the more evidence of this that you can provide the less likely it will be that the application will be deemed to be obvious (commercial value or utility provides a source of motivation for the creation of the Method which a POSITA would be assumed have responded to already if it was obvious to do so). Relevant evidence will therefore be an **Unexpected Result** (we suggest equal to or greater than the performance of the SOTA method) from benchmarking.

Prior Art from same field combined in a new way (Category D): A POSITA will be deemed to have knowledge of the Prior Art. If an improved outcome based on prior art known to the POSITA would be obvious, they would likely have tried it. The most compelling evidence of non-obviousness will therefore be an **Unexpected Result** (we suggest equal to or greater than the performance of the SOTA method) from benchmarking. You should also provide supporting evidence of commercial value or utility; the more evidence of this that you can provide the less likely it will be that the combination will be deemed to be obvious (commercial value or utility provides a source of motivation for the creation of the Method which a POSITA would be assumed have responded to already if it was obvious to do so).

Method incorporates prior art seen in the Field applied in a new way within the Method (i.e. the application of the prior art to solve a mathematical problem or subset of a mathematical problem in a way for which there is no known precedent) (Category E): A POSITA will be deemed to have knowledge of the mathematical method and so you should provide supporting evidence that it would not be obvious for a POSITA to apply the mathematical method to solve the relevant problem in the way that your Method does. If an improved outcome based on prior art known to the POSITA would be obvious, they would likely have tried it and the fact that they haven't suggests it is therefore not obvious. As with Category D, the most compelling evidence of non-obviousness will be an **Unexpected Result** (we suggest equal to or greater than the performance of the SOTA method) from benchmarking. As for Category D, you should also provide supporting evidence of commercial value or utility.

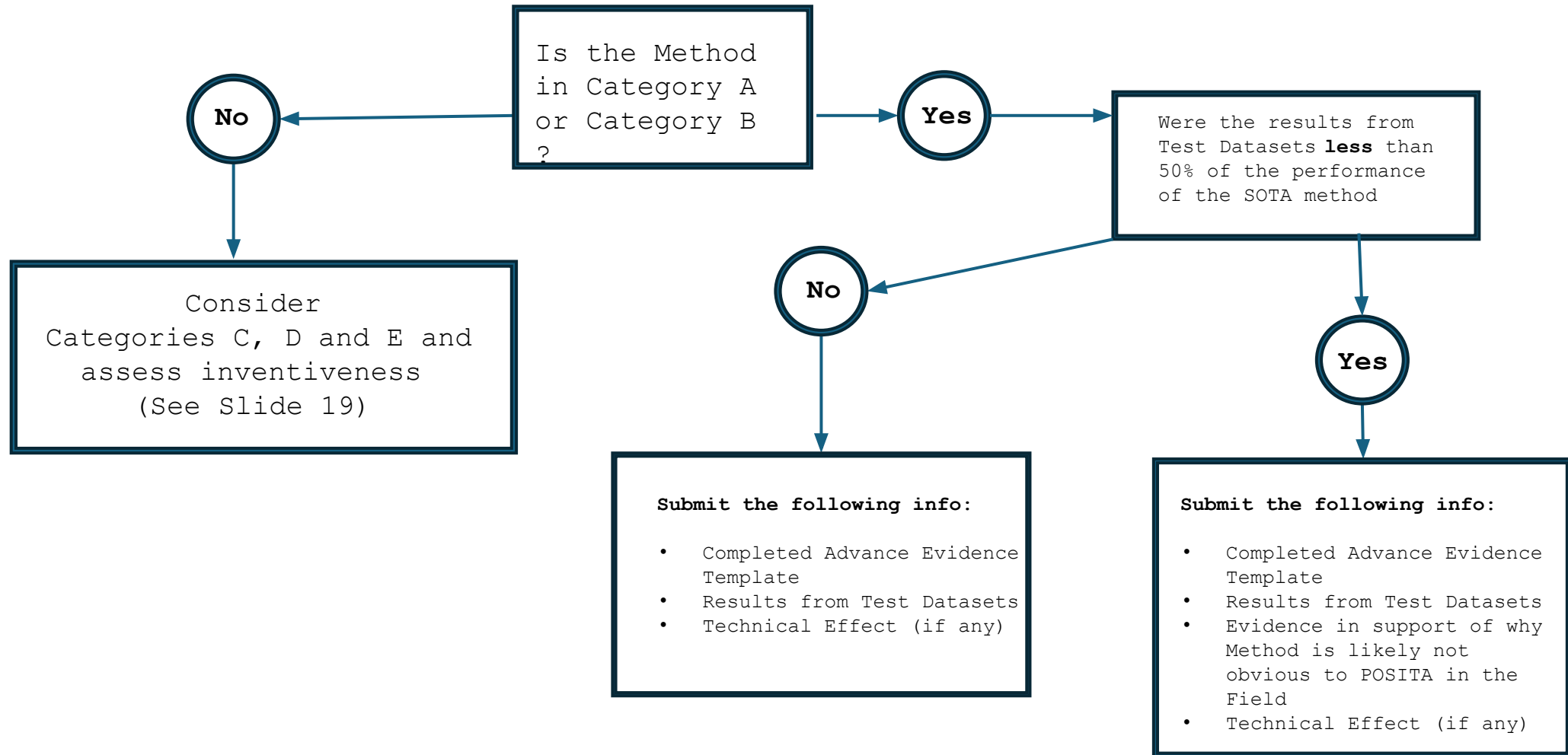
Assessment of algorithmic METHOD for Advance Reward eligibility

Novelty



Assessment of algorithmic METHOD for Advance Reward eligibility

Inventiveness (Categories A and B)



Assessment of algorithmic METHOD for Advance Reward eligibility
Inventiveness (Categories C, D and E)

