Autonomous and Self-organized Artificial Intelligent Orchestrator for a Greener Industry 4.0

White Paper

TALON's Patentability Assessment

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TALON's Patentability Assessment

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Definitions and acronyms

AI	*Artificial Intelligence*
AR	*Augmented Reality*
DT	*Digital Twin*
DoA	*Description of Action*
EC	*European Commission*
EPC	*European Patent Convention*
EPO	*European Patent Office*
FL	*Federated Learning*
GAN	*Generative Adversarial Network*
HE	*Horizon Europe*
IP	*Intellectual Property*
JPO	*Japan Patent Office*
USPTO	*United States Patent and Trademark Office*
VR	*Virtual Reality*
WIPO	*World Intellectual Property Organisation*
XAI	*Explainable AI*

Disclaimer

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Executive Summary

TALON introduces an AI orchestrator that envisions transforming the I5.0 into an automated intelligent platform by exploiting advances in edge networks and bringing intelligence near sensors in embedded systems with limited computational, storage, and communication resources, as well as the integration of advanced and adaptive sensors and perception. As a result of the innovative approaches produced as part of the project, this may give rise to a portfolio of assets that can be worth patenting. The present paper's objective is to present the relevant efforts that project partners have undertaken so as to explore the patentability potential of a select number of concepts produced. As such the methodologies, rationale, assessment mechanisms are presented in sufficient detail, along with a description of the work that remains to be done before the patentability evaluation is fully completed, with a timeline extending to the end of the project.

1 Introduction

TALON (Autonomous and Self-organized Artificial Intelligent Orchestrator for a Greener Industry 4.0) is a significant advance for artificial intelligence technologies in industrial environments. It works in the domain of sustainability and environmental optimization in manufacturing processes. TALON is part of the European Union's Horizon Europe research and innovation programme. It addresses the critical societal challenge of the need for intelligent orchestration systems that can manage and optimize industrial operations. And it does this with a keen eye toward reducing environmental impact.

In the rapidly evolving domain of Industry 4.0, substantial opportunities for intellectual property protection arise from novel technologies and new methodologies—like those underlying TALON's technical solutions. So, the comprehensive assessment of the patentability needs of TALON's results will reinforce the project's exploitation impact. Furthermore, moving toward greener industrial practices necessitates technological innovation and also something that doesn't always go hand-in-hand with innovation—strategic management of intellectual property. IP management makes it far more likely that innovations will be adopted where and when we need them to be. There are potential adopters all across the industrial landscape, from established players in every sector to new startups.

1.1 Objectives of the White Paper

The main aim of this document is to lay out a thorough evaluation procedure for determining whether technical innovations developed in the TALON project can be patented. This means offering the partners of the TALON project clear, well-structured guidelines and assessment tools that can be used to spot, with some degree of confidence, the candidate assets that are worth trying to patent and that are likely to yield significant commercial results.

- Strategic IP Portfolio Development: The intent of the white paper is to assist in the assembly of a coherent intellectual property framework for TALON. The paper does this by identifying the technical assets emanating from TALON that are the most deserving of patent protection and are, therefore, the most likely to lead to revenue generation through either direct or indirect avenues. These avenues could include exclusive rights, cross-licensing agreements, or by acting as a deterrent to competitors.
- Standardization and Quality Assurance: This document grants patentability evaluation of consistent quality across all technical work packages and partner organizations within the TALON consortium. It does so by setting up standardized patentability evaluation criteria and procedures. The document in effect reduces quality variability from the assessments and gives us benchmarks that we can trust for decision-making.
- Risk Mitigation and Resource Optimization: This white paper describes a systematic assessment method that allows patentability problems to be found early. If potential challenges are identified at the outset, technical modifications can be made before the application is filed and significant resources are devoted to prosecution. This is a risk management approach, and it can result in a maximization of the efficiency of intellectual property investments.
- Technology Transfer Facilitation: Thorough documentation of the technical innovations and their assessments of patentability form the foundation of this white paper. They support future technology transfer activities by providing comprehensive technical documentation that can be used in negotiating licenses, discussing partnerships, and pushing for the commercialization of the TALON components.

- Compliance and Best Practices: This document guarantees harmony with the European Patent Convention and international patent law. It gives confidence to the TALON partners that the methodology they assess satisfies recognized professional standards for managing intellectual property.

1.2 Document Structure

This rest of this document is organized as follows:

- Section II "Patentability Methodology" sets up the theoretical foundation for the assessment approach drawing from well-established patent law principles and best practices in intellectual property evaluation. It lays out the conceptual framework that supports the practical assessment tools developed for the project.
- Section III "Evaluation Questionnaire" is the realization of the practical assessing methodology and is based on each of the three fundamental pillars of patentability: novelty, inventive step, and industrial applicability. Each criterion of the assessment is explained in detail.
- Section IV "Patentability Assessment" elaborates on the step-by-step assessment method and the grading system that changes the survey results into usable information about how likely something is to be patentable. It includes details about the algorithms used to do the computations and the sorts of comparisons that can be made with the results.
- Section V "Potential Patentable Assets" uses the assessment methodology as a foundation to pinpoint and evaluate certain technical innovations within the TALON project. This is not an exhaustive evaluation of all the technical work being done in the TALON project, but rather a targeted look at some of the more likely patentable innovations.
- Section VI "Conclusions" presents conclusions and recommendations based on the lessons learnt throughout TALON's patentability assessment.
- Appendix "TALON Patentability Survey" is a practical tool that technical partners can directly implement to evaluate their candidate assets is the complete assessment questionnaire.

2 Patentability Methodology

While searching to choose the most suitable methodology to be applied in TALON's patentability exercise, the team leading the efforts, extensively researched the most widely accepted ones among those that are in use, internationally by established institutions.

It turns out that there is no single, universally accepted, gold standard, but rather a set of three foundational criteria that are being considered, with some variations by the respective regional or national institutions, such as the European Patent Office (EPO) in Europe, the United States Patent and Trademark Office (USPTO) in the US, the Japan Patent Office (JPO) or the World Intellectual Property Organisation (WIPO). These three core criteria have moreover evolved over time through national patent laws and international agreements, to take the shape they currently have.

Given the above, TALON patentability evaluation effort has opted for the European patent examination practice as formalized by the EPO and published in the European Patent Convention's (EPC) Article 52(1) which states that:

"European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application" [1]

Thus, and in accordance with the above, the TALON Patentability Methodology consists essentially of assessing to what extent each of TALON's 10 patentable candidate assets, satisfy the three following EPO core patentability parameters:

- **Novelty**: refers to an assessment of the prior art of the universe, that is anywhere in the world. The novelty requirement is broken if the claims are found in previous publications or any form of public knowledge.
- **Inventive step***:* refers to a check, aiming to evaluate whether a person with average intelligence and skill in the art could have discovered the invention*.*
- **Industrial applicability***:* an invention is considered industrially applicable if it can be made or used in any kind of industry, including agriculture (Article 57, European Patent Convention). The term "industry" is interpreted broadly, encompassing various sectors beyond manufacturing, such as services and agriculture. [2]

The above methodology is applied in practice through the creation of a survey that contains a series of questions. The full set of questions is grouped under each of the above three requirement groups and aims to ascertain whether the respective 3 main requirements are met. The questions and the rationale behind them are presented and discussed in greater detail in the following section III of this paper.

What the survey previously described provides is in essence an arrangement for the owners and developers of each patentable candidate asset, to self-evaluate their asset. This is done through each question being answered by choosing a Likert scale score between 1 (extreme negative) and 5 (extreme positive. In addition to scoring each question, a field is provided for the responder to optionally add some accompanying text, by way of e.g. explanatory, backing-up info notes etc.

In addition, given the innovative nature of the project, and so as to deliver material that is as self-contained as possible, a number of additional questions, that are more descriptive and of rather qualitative nature (as opposed to plain quantitative scoring) have been added. These are answered by text only feedback (i.e. no Likert scale score) and aim to enrich and complement the information conveyed per patentable candidate.

Once completed, the survey forms are to be forwarded to both nominated evaluators for their consideration and assessment. The output of their evaluation is to be shown as part of the final deliverable D6.2 of TALON, that is due to be made available by the end of September 2025.

3 Evaluation questionnaire

TALON's patentability survey serves as a comprehensive assessment tool that guides researchers and technical partners through the complex process of determining whether their innovations meet the fundamental requirements for patent protection.

3.1 Survey Structure and Design Philosophy

The TALON patentability survey, which is available in the Appendix, is organized around the three core pillars of patentability as established by the European Patent Convention and recognized internationally: novelty, inventive step (non-obviousness), and industrial applicability. This structure guarantees that all the essential criteria for patentability are covered comprehensively and that there is a logical flow that resembles the process of examining a patent.

The survey uses a mixed-mode assessment technique that combines quantifiable scoring (1-5 Likert scales) with more qualitative, descriptive fields. This twofold method yields not only unbiased standards for reliable side-by-side assessment but also the in-depth working knowledge so essential for any comprehensive patentability appraisal. The elements that are quantitative allow for a systematic comparison to be made across the various inventions, and they aid in the processes of decision-making. The parts that are qualitative gather the subtle technical details that are essential for the drafting and prosecuting of patents.

The survey starts with a distinct requirement for the description of the component (Q1a). This makes sure that the people evaluating the survey keep their eyes on the particular technical element we are asking them to consider. This method avoids scope creep and allows for exact evaluation of single patentable aspects in broader technical systems.

3.2 Detailed Question Categories and Rationale

3.2.1 Novelty Assessment Framework

The novelty section addresses the fundamental requirement that an invention must be new relative to the state of the art. The survey includes several complementary evaluation criteria.

- Degree of Difference Assessment (Q2a): Determining how similar a new invention is to the closest prior art offers an immediate and rather qualitative glimpse at its potential to be novel. Doing this quickly helps assess whether an invention is, indeed, worth pursuing and, if so, prioritizes it for further attention.
- Prior Art Identification and Comparison (Q2b/c/d): The structured contrast between the asserted invention and the nearest prior art guarantees a systematic appraisal of the technical differences. This twofold perspective (the prior art and the invention) compels evaluators to state with precision what makes their innovation different, which is the all-important step in formulating the patent claim.
- Public Disclosure Evaluation (Q2e/f): Determining whether disclosure of all elements of the invention existed before the effective filing date tests the invention against the absolute novelty standard necessary for patentability. A 5-point scale is used to measure the extent to which the invention was disclosed prior to filing. This is coupled with exact identification of the sources from which disclosure came, and with these results, it becomes possible to navigate patent prosecution much more effectively.

3.2.2 Inventive Step Evaluation Methodology

The inventive step is the most complex aspect of patentability. It deals with the question of what would have been obvious to a person of ordinary skill in the art. It isn't simply the case that patents are granted to inventions that are new and aren't naturally suggested by prior work.

- Parameter Selection Analysis (Q3a): This question acknowledges that numerous technical innovations are about choosing certain parameters or configurations from established ranges. The assessment of obviousness serves to pinpoint whether such choices embody real, inventive contributions.
- Unexpected Effects Documentation (Q3b): Strong indicators of inventive step arise when a technical effect surpasses expected performance. Hence, the survey focuses on painstakingly documenting these effects. This provides crucial evidence for both prosecuting patents and defending against challenges to their validity.
- Technical Improvement Significance (Q3c): Improving something and making it non-obvious is what separates simple optimization from real inventiveness. This is especially the case when the improvements one is evaluating are of the incremental variety, which is all too common in industrial applications.
- Long-Standing Problem Solution (Q3d): Technical inventions that solve long-standing problems get a boost when it comes to looking at whether they are non-obvious. This is a good thing for patent applicants because, historically, context matters when trying to make the case that an invention is patentable.
- Extrapolation and Juxtaposition Analysis (Q3e/f): These criteria tackle the usual obviousness problems by probing whether the invention is just a straightforward variation of familiar techniques or a combination of these techniques that results in unpredictable yet synergistic effects.
- Secondary Considerations (Q3g): Financial success, industrial praise, and getting copied by competitors certainly help indicate that something is non-obvious. These measures may not provide a strictly technical measure of the patentability potential but help quantify objectively the invention's non-obviousness.
- Required Knowledge Assessment (Q3e): The definition of "person skilled in the art" establishes the baseline knowledge and expertise level against which obviousness is measured. Measurement of obviousness ensures that the analysis of inventive step is appropriately calibrated to the specific technical domain.

3.2.3 Industrial Applicability Verification

This section on industrial applicability guarantees that inventions fulfil all practical utility demands. This section ensures that the inventive concepts described in an application are closely tied to real-life situations, that is, optimal use of the concepts is described in the inventions themselves.

- Scientific Viability (Q4a): Natural law compliance reflects a threshold requirement for patentability. This judgment prevents resource expenditures on inventions that are scientifically impossible.
- Practical Application Assessment (Q4b): Assessing the industrial and societal usefulness of inventions ensures they deliver real benefits and not just theoretical possibilities.

- Reproducibility Evaluation (Q4c): The skilled practitioner's ability to put the invention into practice is what dictates patent validity. This appraisal aforementioned allows for the early identification of issues concerning enablement in the development process.
- Technical Problem Solution (Q4d): The patent applications that are strengthened by clearly stated resolved technical issues provide a good basis for arguing the inventive step.
- Transferability Assessment (Q4e): Assessing an invention's potential for transfer across industrial sectors indicates how broadly it can be applied. Inventions that score high on this measure are likely applicable in many areas. They may be worth stronger patent protections because they could directly impact many sectors, cause significant ripple effects or down-stream impacts, or get incorporated into new technologies that then get used in many places.

3.3 Implementation Rationale and Benefits

The TALON patentability survey serves multiple strategic objectives within the project ecosystem:

- Optimization of Resources: By providing systematic and evaluative criteria, the survey allows the efficient allocation of patent prosecution resources to those inventions deemed to have the strongest probability of patentability.
- Standardization of documentation: The arrangement into a structure guarantees an even distribution of the various sorts of documentation that exist across the technical sites and research teams that together form our portfolio, should anything need to be transferred.
- Risk Management: Identifying patentability problems at an early stage gives us the opportunity to make technical corrections or find substitutes and, thus, avoid spending a lot of time and money after our investment has become significantly deeper.
- Portfolio Strategy Support: The comparative analysis across inventions made possible by the quantitative scoring system allows for strategic decisions concerning patent filing priorities and portfolio composition.
- Working across disciplines: The format of the patent allows engineers and other technical groups to work with patent professionals to develop effective patent applications. It is tempting to think that this works equally well in reverse, that inventions can be reformed into patent applications by these same professionals.

3.4 Integration with Project Workflow

The TALON project research and development workflow integrates seamlessly with the questionnaire. The design of the survey reflects the best practices from patent prosecution, while still being accessible to technical researchers who do not have extensive backgrounds in intellectual property. Technical teams assess at the principal project milestones; this occurrence denotes the continuous evaluation of any patentable innovation. Such an emergence occurs any time from the inception of a notion to the realization that a notion qualifies as innovative, a sequence that can transpire within the assignment of a project milestone. This balance means that the survey has practical utility, while also having the rigor necessary for effective patentability assessment in the emerging, competitive landscape of Industry 4.0 technologies.

4 Patentability Evaluation Process

A critical aspect of the patentability assessment process is the final evaluation of the collected patentability surveys. In the timeline of the overall assessment, the evaluation process constitutes the last part of it, which produces the final outcome of the whole procedure. This section initially elaborates on the aim of the patentability evaluation process. Then, it describes all details of the process, providing the required information for replicating it and applying the respective scoring scheme in the context of different cases. Lastly, an example of the patentability evaluation is provided.

4.1 Aim of the Patentability Evaluation Process

The primary aim of the patentability evaluation process is to identify the patentability potential of the item which is under investigation. Thus, it needs to be clarified that this process is not expected to determine whether the investigated item is patentable or not. Such is the aim of a patent submission process, which is not intended to be substituted by the current evaluation process. In more detail, the latter process is expected to generate an indication that is strongly correlated to the degree of patentability potential. On this ground, the anticipated output should not be an on/off flag, but a score on a scale and a textual review that reveal the level of fulfillment of the criteria for a patent grant. Given that a patent submission can prove to be a quite complex, time consuming, and costly procedure with no guaranteed outcome, a patentability evaluation process, as the one introduced here, could constitute a very useful tool that constructively impacts the decision-making process of applying for a patent and consequently become an integral part of the overall procedure, preceding the stage of actually filing a patent application.

4.2 Description of the Patentability Evaluation Process

4.2.1 The Evaluators

The patentability evaluation process requires the appointment of two evaluators, who are responsible for reviewing the completed patentability surveys, calculating the associated scores, and providing their feedback. One of the evaluators, called "internal", is an expert who is actually involved in the project in the context of which the investigated item has been developed. The other evaluator, called "external", is an expert that comes outside the project, in order to inform the whole process with the opinion of a third party. In that manner, both the "internal" and the "external" views are covered in the evaluation process. It is noted that the evaluators are expected to be commonly accepted experts, who have a strong professional profile (either academic or industrial or both) in the respective domain, thus, the capacity to conduct the reviewing. The identification of the evaluators should take place before the completion of the survey. Both of them need to be well informed about the whole patentability process. The evaluation is conducted after the completion of the patentability survey. The evaluators work in parallel and review the material independently. Any supportive material, including the current white paper and related project deliverables, should be made available to them.

4.2.2 The Evaluation Scoring Scheme

The underlying concept of the patentability evaluation process relies on the combination of a quantitative and a qualitative approach. The former approach involves the introduction of a metric that eventually reflects the potential of an item to be considered patentable. It utilizes the Likert scale indications which are associated with various questions within the patentability surveys to compute related scores. The qualitative approach involves the textual input provided by the investigated item's owner to inform the evaluator's opinion and eventually impact the resulted outcome accordingly.

Following this concept, the scoring scheme is designed in such a manner that each one of the three main categories of criteria that determine the patentability of an item are equally contributing to the calculation of the overall score. It is reminded that the aforementioned categories are "novelty", "inventive step", and "industrial applicability" as detailed in Section 1.4 of this white paper. The score of each category is calculated as the mean of the Likert scale values of the included questions, as shown in the following equations:

$$Novelty = \frac{Q2a + Q2e}{2} \quad (1)$$

$$InventiveStep = \frac{Q3b + Q3d + Q3e + Q3f + Q3g}{5} \quad (2)$$

$$IndustrialApplicability = \frac{Q4a + Q4b + Q4c + Q4e}{4} \quad (3)$$

where *Qxy* is the Likert scale value set for the y^{th} question of the x^{th} category.

Next, the three scores resulted in Equations (1), (2), and (3) are summed up to compute the overall score, as shown below:

$$OverallScore = Novelty + IntentiveStep + IndustrialApplicability \quad (4)$$

The score that each one of the two evaluators eventually assigns to the investigated item results by normalizing and applying a power transformation on the overall score resulted in Equation (4). The transformation's preservation of scale boundaries and adjustable nonlinearity makes it particularly valuable for applications requiring score redistribution without altering minimum/maximum values [3]. This is an important step in the process, where the evaluator's expert opinion is incorporated into the reported metric, hence, it actually integrates the quantitative approach that derives from the set Likert scale values with qualitative approach that reflects a well-informed opinion derived from the answers provided to all questions (including textual open-ended answers). The concept here is to come up with a score in the range [0 – 1], which corresponds to the concluded patentability potential of the investigated item, where '0' (i.e., 0%) indicates no patentability potential, while '1' (i.e., 100%) indicates patentability certainty.

The respective algorithm involves the following two steps:

1. Range Normalization:

$$normalizedScore = \frac{originalScore - minScore}{maxScore - minScore} \quad (5)$$

2. Power Transformation:

$$transformedScore = normalizedScore^{p} \quad (6)$$

For the case of the patentability evaluation the following hold:

- The $originalScore$ is equal to the $OverallScore$
- The $minScore$ is equal to '1'
- The $maxScore$ is equal to '15'
- The $normalizedScore$ is equal to the $NormalizedScore$, that reflects the unadjusted resulted normalized score.
- The value of p corresponds to the power parameter that is set by each evaluator to adjust the score in the following manner:

- $p = 1$, the evaluator agrees with the exact scoring provided by the owner of the investigate item, while the provided input does not justify any adjustment to the $NormalizedScore$, which remains unchanged.
- $p > 1$, the evaluator believes that the scoring provided by the owner of the investigated item overrates its patentability potential, hence, taking also the provided input into account, the $NormalizedScore$ is decreased.
- $p < 1$, the evaluator believes that the scoring provided by the owner of the investigated item underrates its patentability potential, hence, taking also the provided input into account, the $NormalizedScore$ is increased.

- The $transformedScore$ is equal to the $EvaluatorScore$, that reflects the adjusted normalized score reported by each evaluator

Based on the above, the following Equations are formed for the patentability evaluation:

$$NormalizedScore = \frac{OverallScore - 1}{15 - 1} \quad (6)$$

$$EvaluatorScore = NormalizedScore^{p} \quad (7)$$

Finally, the score reported by the two evaluators are averaged to compute the investigated item's patentability indicator, as shown in Equation (8), which lies in the range [0 – 1] and is reported in the form of percentage (%).

$$PatentabilityIndicator = \frac{EvalulatorScore_1 + EvalulatorScore_2}{2} \quad (8)$$

4.3 Patentability Evaluation Example

An example of applying the introduced patentability evaluation process is provided in this subsection. In Table 1, the provided values as well as the calculated scores for a hypothetical patentability survey are presented in a spreadsheet. As it can be seen, in the specific example, the first evaluator opted to slightly increase the normalized score by applying a power parameter of 0.9, while the second evaluator opted to increase the normalized score to a higher degree by applying a power parameter of 0.7. It is noted that each expert is expected to provide alongside the scoring, a short justification text that supports their evaluation. The resulting Patentability Indicator is 64%, which corresponds to the patentability potential of the item under investigation.

Figure 1 depicts the impact of the power parameter on the evaluation score, considering as example normalized score the computed value 0.571428571 (which corresponds to $p = 1$).

Table 1: Patentability Evaluation Example Spreadsheet

Q2a	*Q2e*	*Q3b*	*Q3d*	*Q3e*	*Q3f*	*Q3g*	*Q4a*	*Q4b*	*Q4c*	*Q4e*
2	*3*	*2*	*4*	*2*	*5*	*2*	*3*	*2*	*4*	*5*
Novelty		*InventiveStep*					*IndustrialApplicability*			
2.5		3					3.5			
OverallScore										
9										
NormaizedScore										
0.571428571										
p_1						p_2				
0.9						*0.7*				
$EvaluatorScore_1$						$EvaluatorScore_2$				
0.604318314						*0.675885868*				
PatentabilityIndicator										
64%										

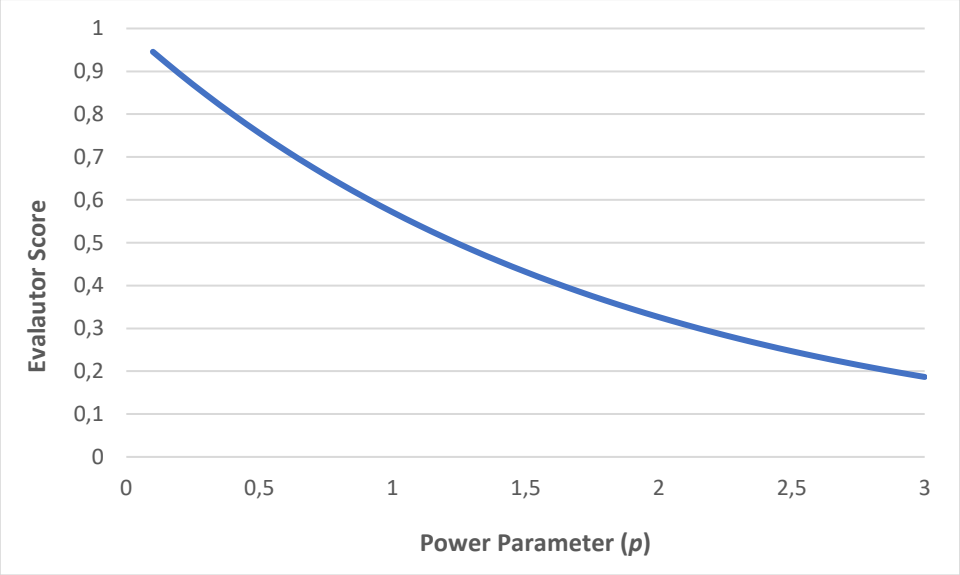

Figure 1. Power parameter impact on the evaluation score

5 Potential patentable assets

The above described methodology and the individual steps described will eventually be applied in the following set of 10 potentially patentable assets. These have been jointly agreed upon by the TALON partners, the project's Coordination and Technical Coordination team, and the partners responsible for the project's exploitation efforts.

The choice of the candidate assets has been made largely based upon the value created by them and their specifics that they are at least worth considering their potential.

Table 2: TALON Patentable candidates

Asset name	Owner partner(s)
Zero-touch AI orchestrator	ENG & UL
DT GAN	CERTH
Few-shot object detection	MINDS
Smart pricing	8BELLS
AR Maintenance application	KU
VR Training application	KU
Federated Learning module	MINDS
Explainable AI (XAI) framework	MINDS
Blockchain Mechanism	SID
Image Anonymisation Module	TEI

The items shown in the table above will be presented in more detail in D6.2, forming part of the greater evaluation outcome as previously stated.

6 Conclusions

The TALON project and its patentability methodology formed the basis for this white paper. The project developed a systematic framework for assessing the innovation potential of its research outcomes. The proposed framework is based in the core criteria of the European Patent Convention: novelty, inventive step, and industrial applicability. TALON initially conducted a set of quantitative and qualitative surveys among its technical domains, using a combination of statistical Likert-scale scoring and insightful qualitative feedback to arrive at some fairly robust findings. These findings serve as a good test of the strength and general applicability of the framework. The outcome is the identification of ten high-value innovations that might serve as good candidates for patent protection. In addition, the patentability assessment process provides much more value than just identifying potential intellectual property. It helps allocate resources effectively, ensures our innovations are not infringing on valid patents, and creates documentation that places the foundation for the technology transfer that will make TALON innovations pay off in the real world.

Appendix: TALON Patentability Survey

1. Title of the Component/Element Considered

a. Description of the Component/Element

- Text (required):

2. Novelty

a. Degree of Difference Assessment

- On a scale from 1 (very similar) to 5 (very different), evaluate the difference between the invention considered and its closest prior art?
    - (1-5):
    - Optional text:

b. Closest Prior Art Identification

- Describe the closest prior art (from the aspect of technical field, problem solved, and key features):
    - Text:

c. Claimed Invention

- Summarize the claimed invention's core technical features:
    - Text:

d. Differences from Prior Art

- List technical differences between the claimed invention and the closest prior art:

e. Public Disclosure

- On a scale from 1 (strongly disagree) to 5 (strongly agree) evaluate whether each and every element or step of the claimed invention was explicitly or inherently disclosed, individually or in combination, in any form of public knowledge (e.g., publications, public use, sales, presentations) before the filing date of a potential patent application?
    - (1-5):
    - Optional text:

f. Closest Public Prior Art

- Please specify where and when the closest prior art was made available to the public (e.g., title of publication, date, website, conference presentation date).

3. Inventive Step (Non-Obviousness)

a. Parameter Selection

- On a scale from 1 (very obvious) to 5 (not at all obvious), how obvious would you evaluate the choice of particular parameters you have made have been to a person skilled in the art at the time of the invention, given the limited range of possibilities?
    - (1-5):
    - Optional text description:

b. Unexpected Effects

- On a scale from to 1 (none) to 5 (many) evaluate whether the invention produced technical effects that are different from or significantly superior to what would have been expected by a person skilled in the art, based on the prior art?
    - (1-5):
    - Optional text explaining the effects:

c. Improvement Significance

- On a scale from 1 (not at all) to 5 (great) evaluate how significant and non-obvious is the technical improvement that the invention offers over the closest prior art?
    - (1-5):
    - Short text description:

d. Long-Standing Problem

- On a scale from 1 (not at all) to 5 (greatly) evaluate whether the invention solves a problem that persists despite prior attempts?
    - (1-5):
    - Optional text about failed prior attempts:

e. Straightforward Extrapolation

- On the scale from 1 (strongly agree) to 5 (strongly disagree), would a person skilled in the art have been motivated or prompted to arrive at the claimed invention merely by a simple extrapolation or straightforward variation of the already known art with a reasonable expectation of success?
    - (1-5):
    - Short text description:

f. Feature Juxtaposition

- On the scale from 1 (strongly agree) to 5 (strongly disagree), is the claimed invention merely a juxtaposition or aggregation of known features without any functional interaction that produces a non-obvious synergistic effect?
    - (1-5):
    - Short text description:

g. Secondary Considerations

- On a scale from 1 () to 5 () evaluate the evidence of commercial success, industry praise, or copying by competitors?
    - (1-5):
    - Optional text:

e. Required Knowledge

- Define the 'person skilled in the art' relevant to this invention. What would their level of knowledge and expertise be at the time of the invention?

4. Industrial Applicability

a. Scientific Viability

- On a scale from 1 (not at all) to 5 (certainly) evaluate whether the invention complies with the laws of physics/nature?
    - (1-5):
    - Optional text:

b. Practical Use

- On a scale from 1 (no practical use) to 5 (high potential for industrial or other practical application and benefit to humanity), evaluate whether there is a practical use or application for the invention?
    - (1-5):
    - Optional text (e.g., target industries):

c. Reproducibility

- On the scale from 1 (strongly disagree) to 5 (strongly agree), can subject matter experts reproduce and utilize the invention based on the disclosure and their general knowledge, without undue experimentation?
    - (1-5):
    - Optional text:

d. Solved Technical Problem

- Does the invention solve a technical problem? If yes, describe the problem.
    - Text:

e. Transferability

- On a scale from 1 (not at all) to 5 (greatly) evaluate the extent that the invention can be transferred in any kind of industry?
    - (1-5):
    - Optional text:

References

[1] European Patent Office, European Patent Convention, Article 52, Patentable Inventions, https://www.epo.org/en/legal/epc/2020/a52.html

[2] European Patent Office, European Patent Convention, Article 57, Industrial Application https://www.epo.org/en/legal/epc/2020/a57.html

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