

Circulating DNA/RNA

Patent Landscape Analysis

June 2021

SAMPLE

TABLE OF CONTENTS

INTRODUCTION	5	IP POSITION OF MAIN APPLICANTS	62
<ul style="list-style-type: none">- Circulating DNA/RNA- Scope of the report- Key features of the report- Objectives of the report		<ul style="list-style-type: none">- IP leadership of patent applicants- IP blocking potential of patent applicants- Strength index of patent portfolios	
METHODOLOGY	12	KEY PATENTS	68
<ul style="list-style-type: none">- Patent search, selection and analysis- Search strategy- Terminologies for patent analysis- Strength and blocking potential		<ul style="list-style-type: none">- Patent citation analysis- Key patent families	
MAIN ASSIGNEES MENTIONED	19	MAIN OPPOSITIONS & LITIGATIONS	92
EXECUTIVE SUMMARY	24	<ul style="list-style-type: none">- Main oppositions on EP patents- Main litigations in the USA	
PATENT LANDSCAPE OVERVIEW	29	PATENT SEGMENTATION	101
<ul style="list-style-type: none">- Time evolution of patent publications- Time evolution by country of filing- Ranking of most prolific patent applicants- Current legal status of the main players- Patent legal status of the corpus- Mapping of main current IP holders- Patenting activity of IP leading companies- Time evolution of main patent assignees		<ul style="list-style-type: none">- Definition- Main assignees by technology- Application: cancer- Application: prenatal- Application: infectious diseases- Application: transplantation- Application: nervous system- Application: cardiovascular system- Technology: detection & analysis- Technology: extraction & preparation	
NEWCOMERS	38	IP PROFILE OF KEY PLAYERS	116
<ul style="list-style-type: none">- Start-up companies- Established companies		CONCLUSION	127
COLLABORATIONS	50	KNOWMADE PRESENTATION	134

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Specialized in analysis of patents and scientific information, Knowmade provides Technology Intelligence and IP strategy consulting services. The company is supporting R&D organizations, industrial companies and investors in their business development by offering them a deep understanding of the technology trends and their IP environment. Knowmade operates in the following industrial sectors: Microelectronics, Compound Semiconductors, Power Electronics, RF & Microwave Devices, MEMS Sensors & Actuators, LED/OLED, Imaging & Display, Photonics, Battery, Manufacturing & Advanced Packaging, Micro & Nanotechnology, Biotechnology, Cellular & Molecular Biology, Microbiology, Dermatology, Pharmacology, Oncology, Immunology, Medical Devices & Medical Imaging, Agri-Food & Environment. Knowmade performs prior art search, patent landscape analysis, scientific literature analysis, patent valuation and freedom-to-operate analysis. In parallel, the company proposes litigation/licensing support, technology scouting and IP watch service. Knowmade's analysts combine their technical and patent expertise by using powerful analytics tools and proprietary methodologies to deliver relevant patent analyses and scientific reviews.

We Know Technology, We Know Patents

INTRODUCTION

Scope of the report

- This report provides a detailed picture of the patent landscape for **Circulating DNA/RNA isolation and detection**.
- This report covers **patents published worldwide up to early March 2021**.
- We have selected and analyzed about **2,447 patent families** relevant to the scope of this report.

Included in the report

- ✓ All living organisms (human, animal, bacterial, viral, etc.)
- ✓ All nucleic acids groups (messenger, micro, mitochondrial, etc.)
- ✓ In all biological fluids (blood, plasma, urine, etc.)
- ✓ Applications: infectious diseases, cancer, prenatal, etc.
- ✓ Technologies: isolation, detection, identification, preservation, degradation, etc.

Not included in the report

- X DNA/RNA in, or associated, with exosomes or vesicles
- X Circulating tumoral cells (CTC) or fetal cells
- X Cell lysis to analyze DNA/RNA released
- X Tissue samples
- X Other fluid other than a biological fluid (e.g., wastewater)
- X Cell free system experiment

INTRODUCTION

Key features of the report

- **Essential patent data for Circulating DNA/RNA isolation and detection.**
- **In-depth patent analyses of key technologies and key players** including:
 - Time evolution of patent publications and countries of patent filings;
 - Current legal status of patents;
 - Ranking of main patent applicants;
 - Joint developments and IP collaboration network of main patent applicants;
 - Key patents;
 - Relative strength of main companies IP portfolio; and
 - Matrix patent applicants/technology issues for main IP players.
- **IP profiles presentation of 10 key players**, including key patents, technological issues, partnerships, IP strength: Roche, Guardant Health, Illumina, Integrated Genetics, etc.



INTRODUCTION

Key features of the report

- **Excel database** comprising all analyzed patents of the report is provided.
- This **patent database** allows multi-criteria searches, including:
 - Patent publication number
 - Hyperlinks to the original documents
 - Priority date
 - Title
 - Abstract
 - Patent assignees
 - Technical segmentation
 - Legal status for each member of the patent family.
- The findings, interpretations and conclusions expressed in this report are entirely those of Knowmade and may not constitute or imply endorsement by a decision-making body such as a court of law or a patent office. Any assessment of the effect or scope of pending applications or granted patents reflects our own views and these are not necessarily those of a Patent Attorney. Should confirmation of our assessment in this respect be required, we recommend that you seek the advice of a national Patent Attorney.



Patent Landscape Overview

Patent assignees, IP dynamics, patent legal status, patent geographical coverage

SAMPLE

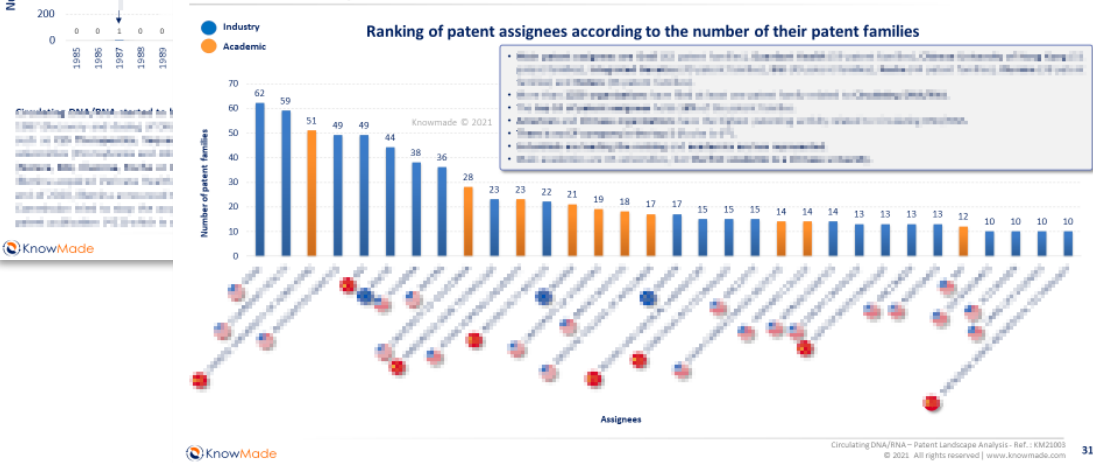
PATENT LANDSCAPE OVERVIEW

Time Evolution of Patent Publications



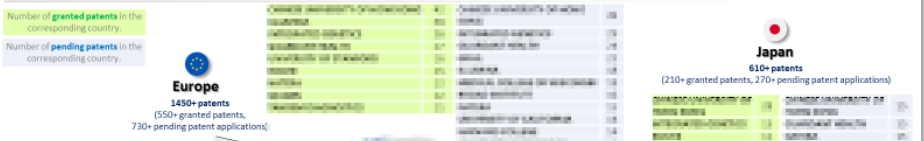
PATENT LANDSCAPE OVERVIEW

Main Patent Assignees



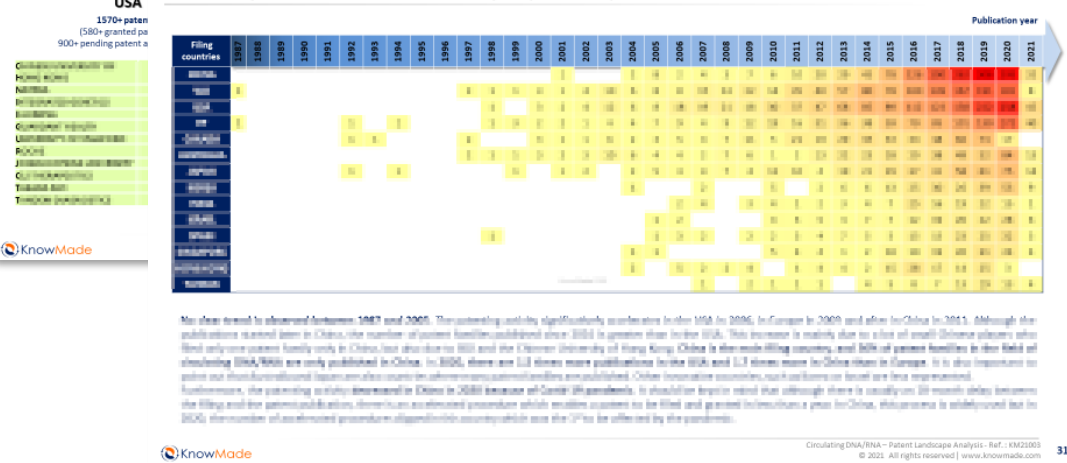
PATENT LANDSCAPE OVERVIEW

Mapping of Main Current Patent Holders



PATENT LANDSCAPE OVERVIEW

Chronological Evolution of the Filings by Country



Patent Portfolios Benchmarking: Beyond the Quantity

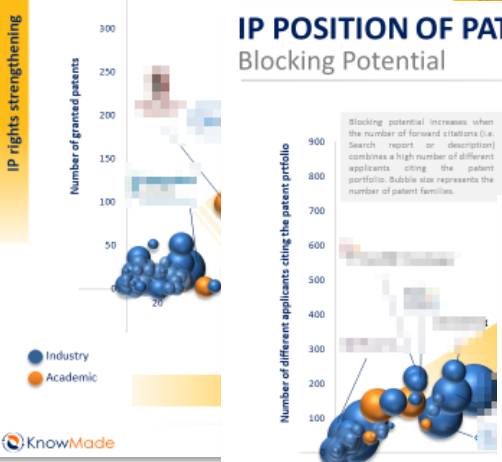
Who has the best patent portfolio?

SAMPLE

IP POSITION OF PATENT APPLICANTS

IP Leadership of Patent Assignees

IP leadership increases when the patent applicant combines a high number of granted and pending patents. Bubble size represents the number of patent families selected for the study.



IP POSITION OF PATENT APPLICANTS

Blocking Potential

Blocking potential increases when the number of forward citations (i.e. Search report or description) combines a high number of different applicants citing the patent portfolio. Bubble size represents the number of patent families.



Note: This graph is at patent portfolio level. The i each patent document of the patent families. The difficult to circumvent in a technology. The IP bloc

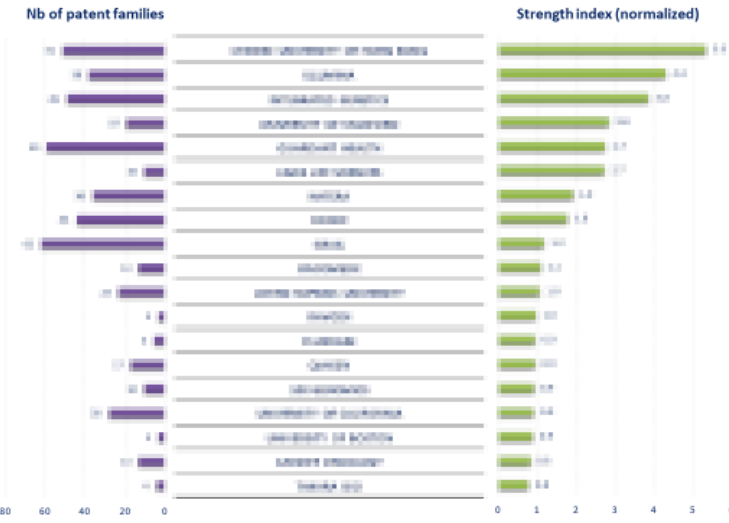
KnowMade

The Chinese University of Hong Kong has a strong IP leadership, consolidating 884,884. This academic player is the one with the most of granted patents and pending patent applications. Since 2013, the university filed many patents per year which also have a high geographical coverage. The university is focused on cell line (CRISPR-Cas9) derivation for commercial fetal diagnostics.

Patent portfolios presenting high IP leading potential are efficient to evaluate patentability of patent applications (i.e. abstracts, claims, abstracts) and are particularly in order to identify the most relevant prior art (i.e. prior art) for the patenting activity of the competition (i.e. novelty and non-obviousness).

IP POSITION OF PATENT APPLICANTS

Strength Index (2/2)



Chinese University of Hong Kong (CUHK) has the strongest patent portfolio thanks to its high number of patent families, granted patents and pending patent applications. Moreover, this company researches numerous forward citations, and thus a very large geographical coverage.

Harvard has a high strength index for the same reason as CUHK. However, Harvard has less granted patents and pending patent applications than CUHK.

Despite its high number of patent families and very high geographical coverage, Novartis (Novartis) has a moderate strength index and consequently less priority patent portfolios. Indeed, this company is not really strong in specific technological competences like CRISPR-Cas9 (i.e. CRISPR-Cas9) or gene editing.

Novartis has a high number of patent families and very high geographical coverage. However, its strength index is lower than Novartis. Novartis is a pharmaceutical company, and its patent portfolio is not highly cited yet. This situation should change rapidly.

Cardi Life Sciences patent portfolio showed a high strength index in view of the relatively small size of the patent portfolio (50 patent families). Analysis showed that this company has a high forward citations.

Regarding the University of California, the reason is obvious: its patent portfolio is quite large (100) with a strong geographical coverage (400000). However, this company is not strong in specific technological competences like CRISPR-Cas9 (i.e. CRISPR-Cas9) or gene editing.

Identification of the patent families with the higher impact

9

What are the key IP players for each segments?

10

Useful patent database allows multi-criteria searches

SAMPLE

Patent information

Segmentation

ORDER FORM

Circulating DNA/RNA

Patent Landscape Analysis – June 2021

Ref.:KM21003



SHIP TO

Name (Mr/Ms/Dr/Pr):

Job Title:

Company:

Address:

City:

State:

Postcode/Zip:

Country:

VAT ID Number for EU members:

Tel:

Email:

Date:

PAYMENT METHODS

Check

To pay your invoice using a check, please mail your check to the following address:

KnowMade S.A.R.L.
2405 route des Dolines
06902 Valbonne Sophia Antipolis
FRANCE

Money Transfer

To pay your invoice using a bank money wire transfer please contact your bank to complete this process. Here is the information that you will need to submit the payment:

Payee: KnowMade S.A.R.L.
Bank: Banque Populaire Méditerranée, CAP 3000 Quartier du lac, 06700 St Laurent du Var, France
IBAN: FR76 1460 7003 6360 6214 5695 139
BIC/SWIFT: CCBPFRPPMAR

Paypal

In order to pay your invoice via PAYPAL, you must first register at www.paypal.com. Then you can send money to the KnowMade S.A.R.L. by entering our E-mail address contact@knowmade.fr as the recipient and entering the invoice amount.

RETURN ORDER BY

E-mail: contact@knowmade.fr

Mail: KnowMade S.A.R.L., 2405 route des Dolines, 06902 Valbonne Sophia Antipolis, FRANCE

PRODUCT ORDER

€3,990 – Multi user license*

For price in dollars, please use the day's exchange rate. For French customer, add 20% for VAT.

All reports are delivered electronically in PDF format at payment reception.

**The report can be shared with the employees of the Company purchasing the report. Subsidiaries and joint-ventures are excluded. Please be aware that the report is watermarked on each page, with the name of the recipient and the organization (the name mentioned on the PO). This watermark also reaffirms that report sharing is not allowed.*

I hereby accept Knowmade's Terms and Conditions of Sale

Signature:

Terms and Conditions of Sales

DEFINITIONS

“Acceptance”: Action by which the Buyer accepts the terms and conditions of sale in their entirety. It is done by signing the purchase order which mentions “I hereby accept Knowmade’s Terms and Conditions of Sale”.

“Buyer”: Any business user (i.e. any person acting in the course of its business activities, for its business needs) entering into the following general conditions to the exclusion of consumers acting in their personal interests.

“Contracting Parties” or “Parties”: The Seller on the one hand and the Buyer on the other hand.

“Intellectual Property Rights” (“IPR”) means any rights held by the Seller in its Products, including any patents, trademarks, registered models, designs, copyrights, inventions, commercial secrets and know-how, technical information, company or trading names and any other intellectual property rights or similar in any part of the world, notwithstanding the fact that they have been registered or not and including any pending registration of one of the above mentioned rights.

“License”: For the reports and databases, 2 different licenses are proposed. The buyer has to choose one license:

1. Single user license: a single individual at the company can use the report.

2. Multi user license: The report can be shared with the employees of the Company purchasing the report. Subsidiaries and joint-ventures are excluded.

“Products”: Reports are established in PowerPoint and delivered on a PDF format and the database may include Excel files.

“Seller”: Based in Sophia Antipolis (France headquarters), Knowmade is a technology intelligence company specialized in the research and analysis of scientific and technical information. We provide patent landscapes and scientific state of the art with high added value to businesses and research laboratories. Our intelligence digests play a key role to define your innovation and development strategy.

1. SCOPE

1.1 The Contracting Parties undertake to observe the following general conditions when agreed by the Buyer and the Seller. ANY ADDITIONAL, DIFFERENT, OR CONFLICTING TERMS AND CONDITIONS IN ANY OTHER DOCUMENTS ISSUED BY THE BUYER AT ANY TIME ARE HEREBY OBJECTED TO BY THE SELLER, SHALL BE WHOLLY INAPPLICABLE TO ANY SALE MADE HEREUNDER AND SHALL NOT BE BINDING IN ANY WAY ON THE SELLER.

1.2 This agreement becomes valid and enforceable between the Contracting Parties after clear and non-equivocal consent by any duly authorized person representing the Buyer. For these purposes, the Buyer accepts these conditions of sales when signing the purchase order which mentions “I hereby accept Knowmade’s Terms and Conditions of Sale”. This results in acceptance by the Buyer.

1.3 Orders are deemed to be accepted only upon written acceptance and confirmation by the Seller, within [7 days] from the date of order, to be sent either by email or to the Buyer’s address. In the absence of any confirmation in writing, orders shall be deemed to have been accepted.

2. MAILING OF THE PRODUCTS

2.1 Products are sent by email to the Buyer:

- within [1] month from the order for Products already released; or

- within a reasonable time for Products ordered prior to their effective release. In this case, the Seller shall use its best endeavours to inform the Buyer of an indicative release date and the evolution of the work in progress.

2.2 Some weeks prior to the release date the Seller can propose a pre-release discount to the Buyer.

The Seller shall by no means be responsible for any delay in respect of article 2.2 above, and including in cases where a new event or access to new contradictory information would require for the analyst extra time to compute or compare the data in order to enable the Seller to deliver a high quality Products.

2.3 The mailing of the Product will occur only upon payment by the Buyer, in accordance with the conditions contained in article 3.

2.4 The mailing is operated through electronic means either by email via the sales department. If the Product’s electronic delivery format is defective, the Seller undertakes to replace it at no charge to the Buyer provided that it is informed of the defective formatting within 90 days from the date of the original download or receipt of the Product.

2.5 The person receiving the Products on behalf of the Buyer shall immediately verify the quality of the Products and their conformity to the order. Any claim for apparent defects or for non-conformity shall be

sent in writing to the Seller within 8 days of receipt of the Products. For this purpose, the Buyer agrees to produce sufficient evidence of such defects.

2.6 No return of Products shall be accepted without prior information to the Seller, even in case of delayed delivery. Any Product returned to the Seller without providing prior information to the Seller as required under article 2.5 shall remain at the Buyer’s risk.

3. PRICE, INVOICING AND PAYMENT

3.1 Prices are given in the orders corresponding to each Product sold on a unit basis or corresponding to annual subscriptions. They are expressed to be inclusive of all taxes. The prices may be reevaluated from time to time. The effective price is deemed to be the one applicable at the time of the order.

3.2 Payments due by the Buyer shall be sent by cheque payable to Knowmade, PayPal or by electronic transfer to the following account:

Banque Populaire Méditerranée, CAP 3000 Quartier du lac, 06700 St Laurent du Var, France

BIC or SWIFT code: CCBPFRPPMAR

IBAN: : FR76 1460 7003 6360 6214 5695 139

To ensure the payments, the Seller reserves the right to request down payments from the Buyer. In this case, the need of down payments will be mentioned on the order.

3.3 Payment is due by the Buyer to the Seller within 30 days from invoice date, except in the case of a particular written agreement. If the Buyer fails to pay within this time and fails to contact the Seller, the latter shall be entitled to invoice interest in arrears based on the annual rate Refi of the «BCE» + 7 points, in accordance with article L. 441-6 of the French Commercial Code. Our publications (report, database, tool...) are delivered only after reception of the payment.

3.4 In the event of termination of the contract, or of misconduct, during the contract, the Seller will have the right to invoice at the stage in progress, and to take legal action for damages.

4. LIABILITIES

4.1 The Buyer or any other individual or legal person acting on its behalf, being a business user buying the Products for its business activities, shall be solely responsible for choosing the Products and for the use and interpretations he makes of the documents it purchases, of the results he obtains, and of the advice and acts it deduces thereof.

4.2 The Seller shall only be liable for (i) direct and (ii) foreseeable pecuniary loss, caused by the Products or arising from a material breach of this agreement

4.3 In no event shall the Seller be liable for:

a) damages of any kind, including without limitation, incidental or consequential damages (including, but not limited to, damages for loss of profits, business interruption and loss of programs or information) arising out of the use of or inability to use the Seller’s website or the Products, or any information provided on the website, or in the Products;

b) any claim attributable to errors, omissions or other inaccuracies in the Product or interpretations thereof.

4.4 All the information contained in the Products has been obtained from sources believed to be reliable. The Seller does not warrant the accuracy, completeness adequacy or reliability of such information, which cannot be guaranteed to be free from errors.

4.5 All the Products that the Seller sells may, upon prior notice to the Buyer from time to time be modified by or substituted with similar Products meeting the needs of the Buyer. This modification shall not lead to the liability of the Seller, provided that the Seller ensures the substituted Product is similar to the Product initially ordered.

4.6 In the case where, after inspection, it is acknowledged that the Products contain defects, the Seller undertakes to replace the defective products as far as the supplies allow and without indemnities or compensation of any kind for labor costs, delays, loss caused or any other reason. The replacement is guaranteed for a maximum of two months starting from the delivery date. Any replacement is excluded for any event as set out in article 5 below.

4.7 The deadlines that the Seller is asked to state for the mailing of the Products are given for information only and are not guaranteed. If such deadlines are not met, it shall not lead to any damages or cancellation of the orders, except for non-acceptable delays exceeding [4] months from the stated deadline, without information from the Seller. In such case only, the Buyer shall be entitled to ask for a reimbursement of its first down payment to the exclusion of any further damages.

4.8 The Seller does not make any warranties, express or implied, including, without limitation, those of

saleability and fitness for a particular purpose, with respect to the Products. Although the Seller shall take reasonable steps to screen Products for infection of viruses, worms, Trojan horses or other codes containing contaminating or destructive properties before making the Products available, the Seller cannot guarantee that any Product will be free from infection.

5. FORCE MAJEURE

The Seller shall not be liable for any delay in performance directly or indirectly caused by or resulting from acts of nature, fire, flood, accident, riot, war, government intervention, embargoes, strikes, labor difficulties, equipment failure, late deliveries by suppliers or other difficulties which are beyond the control, and not the fault of the Seller.

6. PROTECTION OF THE SELLER’S intellectual property

6.1 All intellectual property rights attached to the Products are and remain the property of the Seller and are protected under French and international copyright law and conventions.

6.2 The Buyer agreed not to disclose, copy, reproduce, redistribute, resell or publish the Product, or any part of it to any other party other than employees of its company. The Buyer shall have the right to use the Products solely for its own internal information purposes. In particular, the Buyer shall therefore not use the Product for purposes such as:

- Information storage and retrieval systems;

- Recordings and re-transmittals over any network (including any local area network);

- use in any timesharing, service bureau, bulletin board or similar arrangement or public display;

- Posting any Product to any other online service (including bulletin boards or the Internet);

- Licensing, leasing, selling, offering for sale or assigning the Product.

6.3 The Buyer shall be solely responsible towards the Seller of all infringements of this obligation, whether this infringement comes from its employees or any person to whom the Buyer has sent the Products and shall personally take care of any related proceedings, and the Buyer shall bear related financial consequences in their entirety.

6.4 The Buyer shall define within its company point of contact for the needs of the contract. This person will be the recipient of each new report in PDF format. This person shall also be responsible for respect of the copyrights and will guaranty that the Products are not disseminated out of the company.

7. TERMINATION

7.1 If the Buyer cancels the order in whole or in part or postpones the date of mailing, the Buyer shall indemnify the Seller for the entire costs that have been incurred as at the date of notification by the Buyer of such delay or cancellation. This may also apply for any other direct or indirect consequential loss that may be borne by the Seller, following this decision.

7.2 In the event of breach by one Party under these conditions or the order, the non-breaching Party may send a notification to the other by recorded delivery letter upon which, after a period of thirty (30) days without solving the problem, the non-breaching Party shall be entitled to terminate all the pending orders, without being liable for any compensation.

8. MISCELLANEOUS

All the provisions of these Terms and Conditions are for the benefit of the Seller itself, but also for its licensors, employees and agents. Each of them is entitled to assert and enforce those provisions against the Buyer.

Any notices under these Terms and Conditions shall be given in writing. They shall be effective upon receipt by the other Party.

The Seller may, from time to time, update these Terms and Conditions and the Buyer, is deemed to have accepted the latest version of these terms and conditions, provided they have been communicated to him in due time.

9. GOVERNING LAW AND JURISDICTION

9.1 Any dispute arising out or linked to these Terms and Conditions or to any contract (orders) entered into in application of these Terms and Conditions shall be settled by the French Commercial Courts of Grasse, which shall have exclusive jurisdiction upon such issues.

9.2 French law shall govern the relation between the Buyer and the Seller, in accordance with these Terms and Conditions.

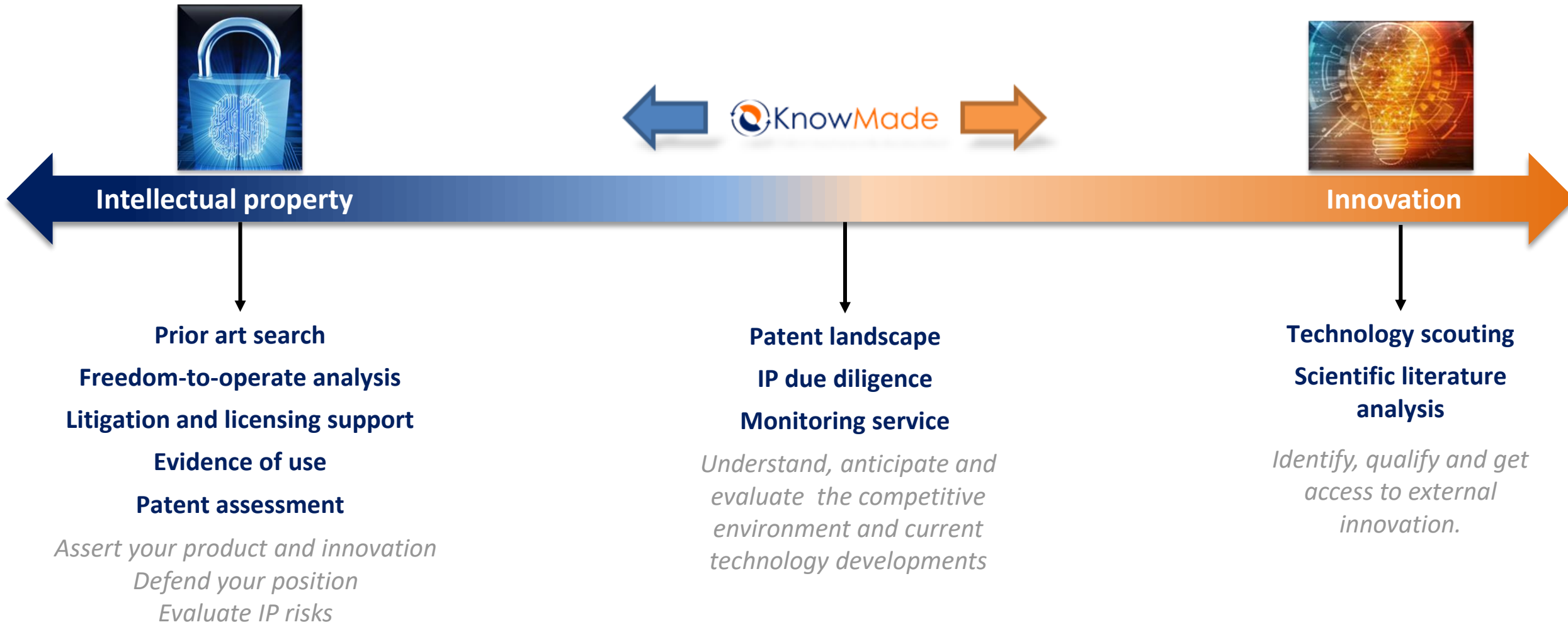
KNOWMADE

Company presentation

CUSTOM STUDY & CONSULTING

Tailor-made analysis to meet your needs and budgetary constraints

Knowmade services are at the border between IP and Innovation.
Tailor made analysis allow you to define the scope and focus to fit your needs and budget.



KNOWMADE ACTIVITIES

Our main fields of expertise

RF & Telecommunication

- Emerging materials
- Compound semiconductor
- RF filters & Amplifiers
- Front end modules
- Antenna

Medtech & Agrifood

- Microfluidic
- Medical diagnostic
- Biotech & Pharmaceuticals
- Agrifood

MEMS, Sensors & Display

- Optical sensors
- MEMS transducers and sensors
- Optical sources & display

Power

- Emerging materials
- Compound semiconductor
- Battery & power managements
- Power electronics





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