

Nanopore Sequencing

Patent Landscape Analysis

February 2019

From Patents to Business Intelligence

SAMPLE

Picture: Joseluissc3

TABLE OF CONTENTS

INTRODUCTION **5**

- Nanopore sequencing
- Scope of the report
- Key features of the report
- Objectives of the report
- Related reports

METHODOLOGY **13**

- Patent search, selection and analysis
- Search strategy
- Key patent identification
- Terminologies for patent analysis

MAIN ASSIGNEES MENTIONED **24**

EXECUTIVE SUMMARY **31**

PATENT LANDSCAPE OVERVIEW **36**

- Time evolution of patent publications
- Countries of patent filings
- Time evolution by country of filing
- Ranking of most prolific patent applicants
- Mapping of main current IP holders
- Mapping of main current IP applicants

IP POSITION OF MAIN PATENT ASSIGNEES **43**

- Strength index of patent portfolios
- Patent citation analysis
- IP blocking potential of patent applicants
- Time evolution for main patent applicants
- Countries of filings for main patent applicants

- Summary of applicant's patent portfolios
- Patent applicants IP network
- IP leadership of patent applicants
- Granted patents near expiration
- Degree of specialization
- Potential future plaintiffs

ANALYSIS BY TECHNOLOGY **66**

- Technical Segmentation by Technology
- Main Assignees by Technology
- Time Evolution by Technology
- Time Evolution by Country
- Legal Status by Technology
- Conclusion

ANALYSIS BY APPLICATION **83**

- Technical Segmentation by Application
- Main Assignees by Application
- Time Evolution by Application
- Legal Status by Application
- Conclusion

MAIN PATENT LITIGATIONS **97**

- Illumina vs Oxford Nanopore Technologies
- Pacific Biosciences vs Oxford Nanopore Technologies
- University of California vs Roger Chen and Genia Technologies

IP PROFILE OF KEY PLAYERS **102**

- Harvard University
- University of California

- Chinese University of Hong Kong
- Oxford Nanopore Technologies
- Roche
- Nabsys
- Two Pore Guys
- Quantapore
- Hitachi
- Illumina
- Pacific Biosciences of California
- Sequenom
- Agilent Technologies
- Thermo Fisher Scientific

For each selected player:

- *Company profile and news*
- *Summary of the patent portfolio*
- *Key patents families*

OTHER KEY PATENTS **164**

CONCLUSION **174**

KNOWMADE PRESENTATION **182**

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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

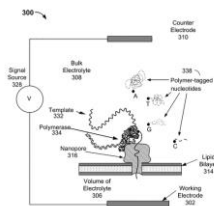
Scope of the Report

SAMPLE

- This report provides a detailed picture of the patent landscape for **nanopore sequencing**.
- This report covers **patents published worldwide up to August 2018**.
- We have selected and analyzed about **1,600 patent families** relevant to the scope of this report.

Included in the report

- ✓ Patents related to **nanopore sequencing**
- ✓ Patents related to the three main nanopore sequencing modalities:
 - ✓ Protein nanopores
 - ✓ Solid-state nanopores
 - ✓ Hybrid nanopores
- ✓ Patents related to various applications nanopore sequencing can be used for, such as:
 - ✓ infectiology
 - ✓ oncology
 - ✓ prenatal diagnostics



[US2018/0037948](#)

FIG. 9			
	IPC-A	IPC	IPC-B
Single-Molecule Sequencing	1	0	0
Mass Spectrometry	1	0	0
Genetics	0	26	0
Microfluidics	0	1	0
Long-Range Sequencing	0	1	1
Long-Range Sequencing	0	0	0
Long-Range Sequencing	0	0	1
Sequencing	0	0	1
Sequencing	0	2	1
Total	18 (88%)	28 (14 (52%))	1 (100%)

[WO2017/106481](#)

Not included in the report

- X Patents only dedicated to other sequencing methods
- X Patents about nanopores not claiming or mentioning a sequencing application

INTRODUCTION

Key Features of the report

- The report provides **essential patent data** about **nanopore sequencing**.
- It provides **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.
 - Matrix patent applicants/technology issues for main IP players.
- The **IP profiles of 20 key players** is presented, including key patents, technological issues, partnerships, IP strength: Oxford Nanopore Technologies, Agilent Technologies, Pacific Biosciences of California, Illumina, Harvard University, University of California, etc.



INTRODUCTION

Key Features of the report

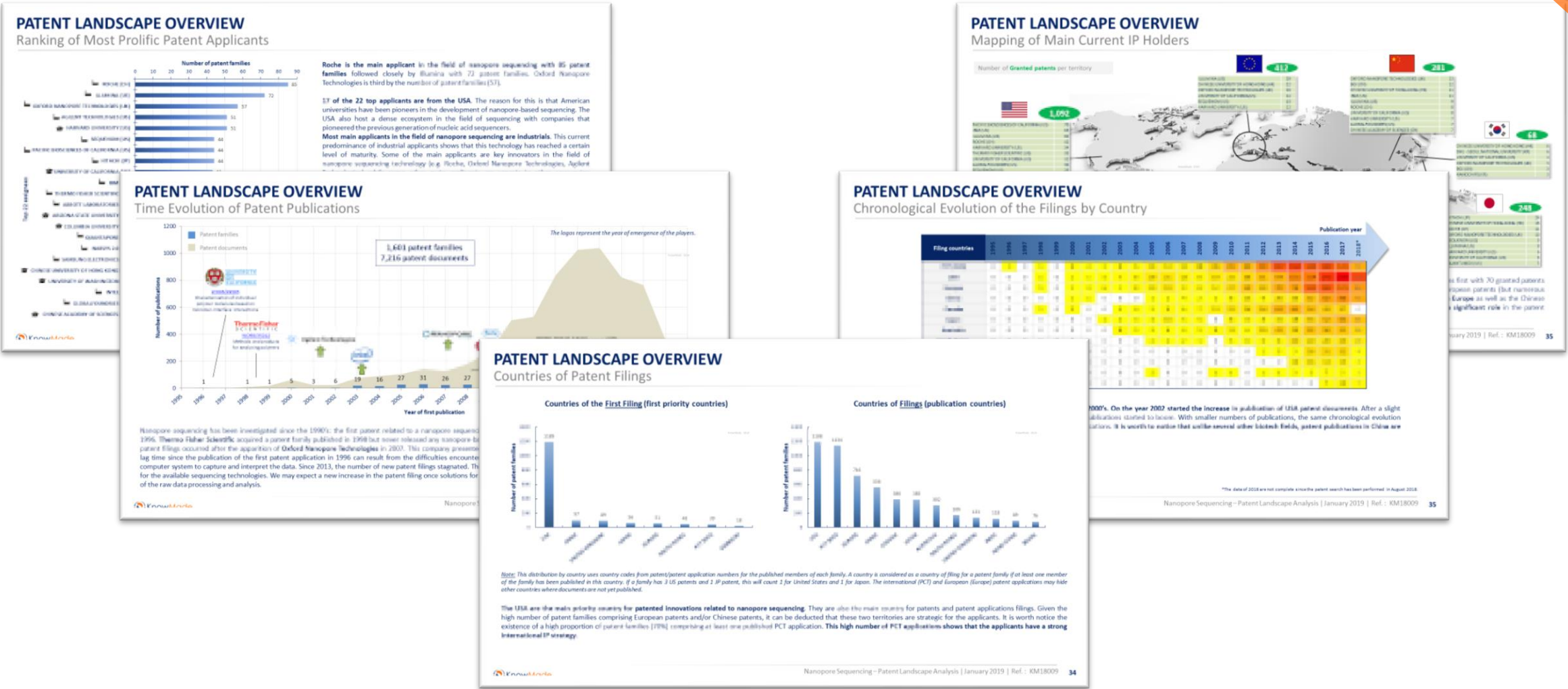
- The report also provides an extensive **Excel database** with all patents analyzed in the report.
- This **patent database** allows multi-criteria searches, including:
 - Patent publication number
 - Hyperlinks to the original documents
 - Priority date
 - Title
 - Abstract
 - Patent assignees
 - Technical segmentation
 - Legal status for each member of the patent family
- This report **does not provide** any insight **analyses or counsel regarding legal aspects** or the validity of any individual patent. Knowmade is a research firm that provides technical analysis and technical opinions. Knowmade is not a law firm. The research, technical analysis and/or work proposed or provided by Knowmade and contained herein is not a legal opinion and should not be construed as such.



Patent Landscape Overview

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

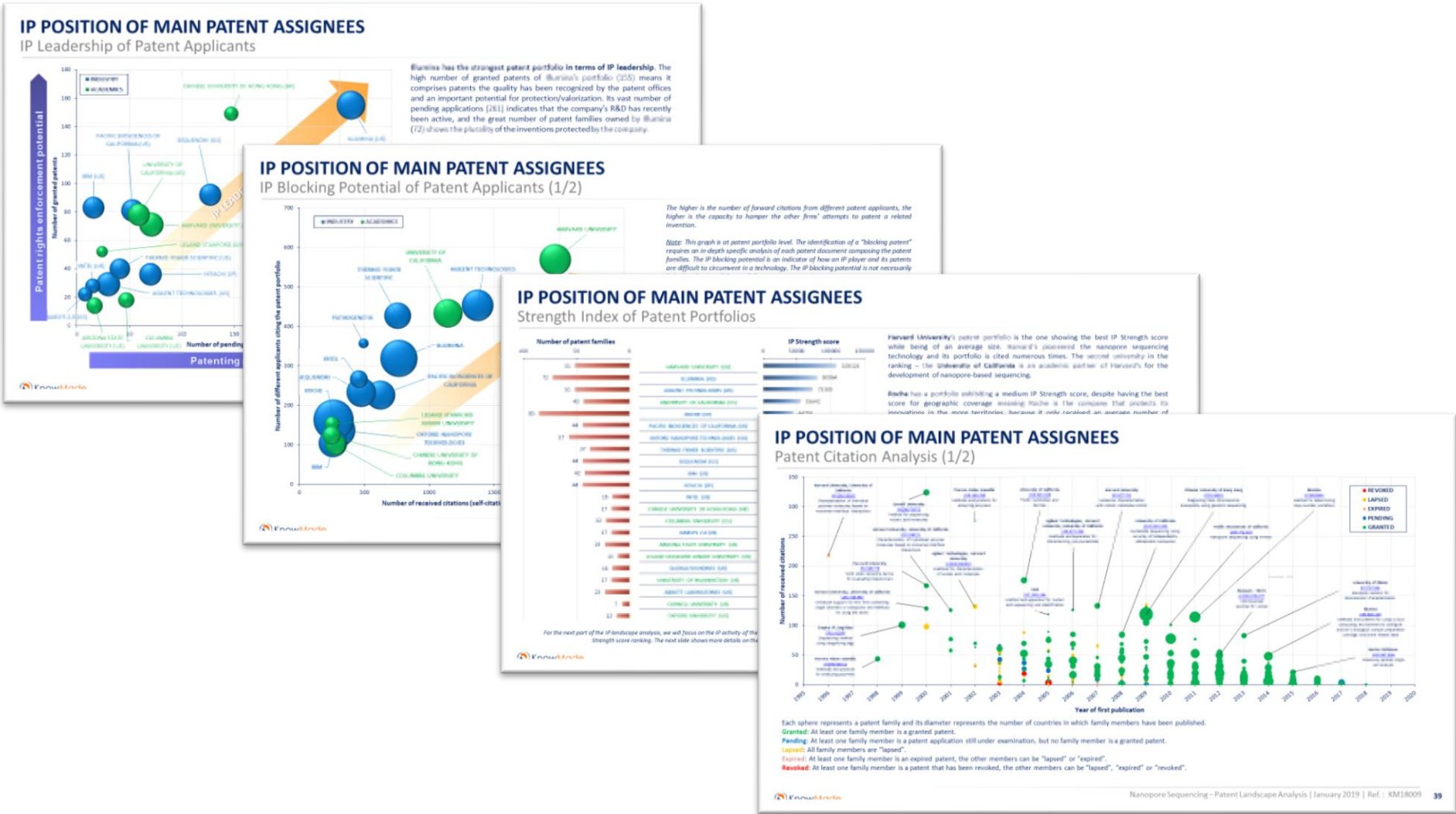
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Patent Portfolios Benchmarking: Beyond the Quantity

Who has the best patent portfolio?

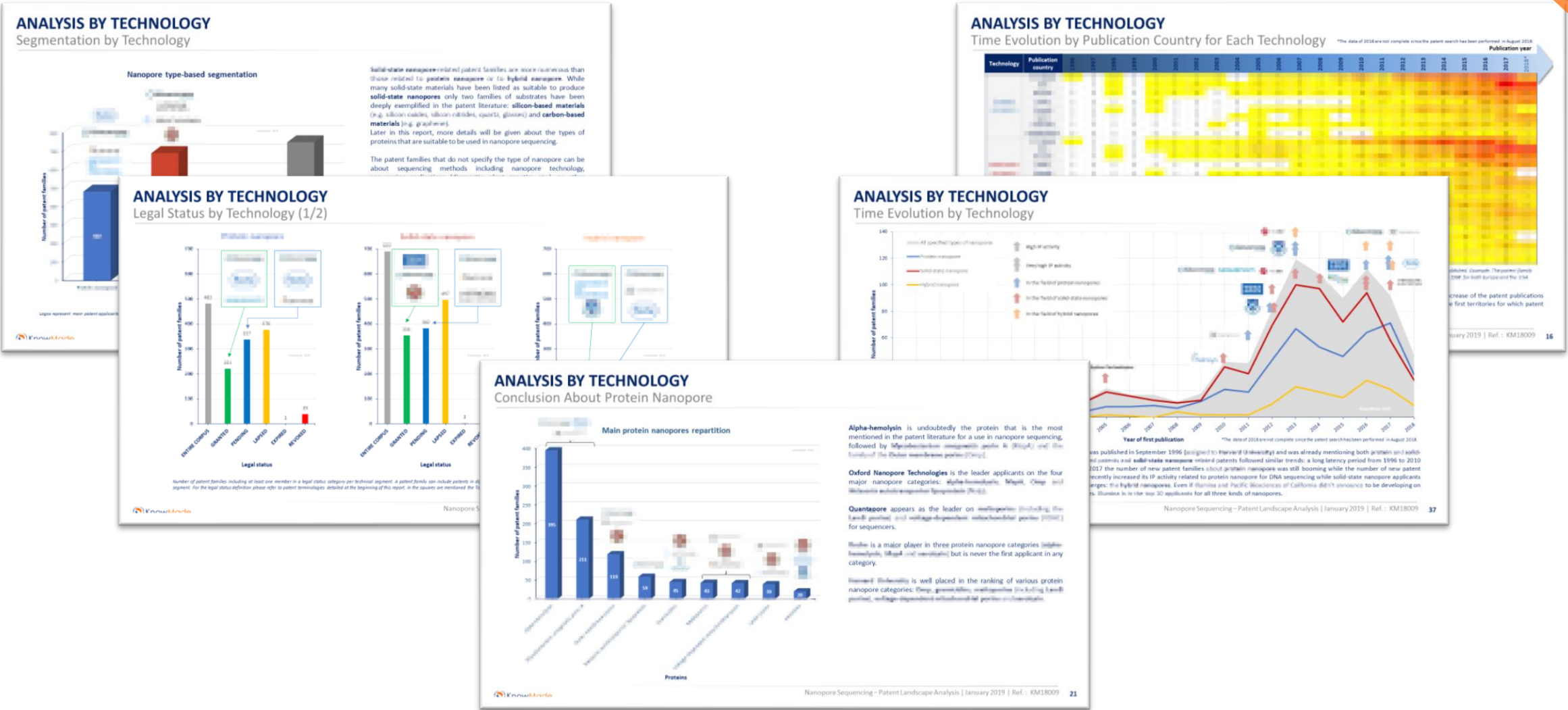
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Patent Segmentation

What are the key IP players per nanopore technology?

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Patent Segmentation

What are the key IP players per application?

SAMPLE

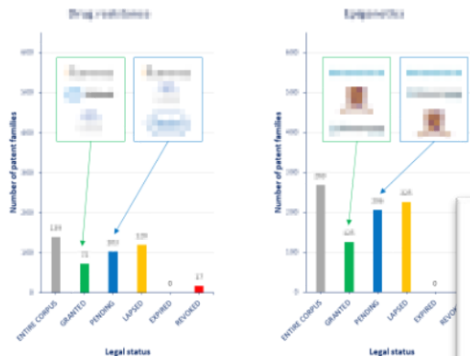
ANALYSIS BY APPLICATION

Main Assignees by Application (1/2)



ANALYSIS BY APPLICATION

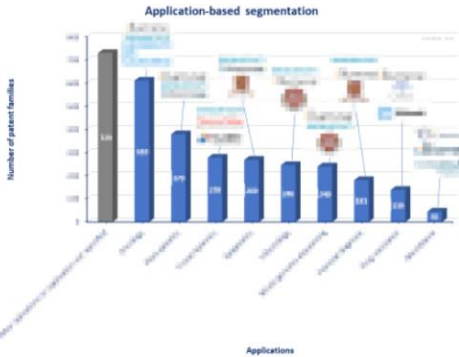
Legal Status by Application (1/4)



ANALYSIS BY APPLICATION

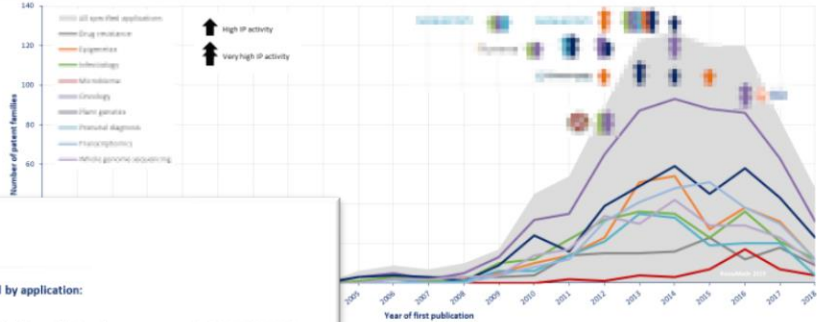
Segmentation by Application (1/2)

In order to fully understand the applicative potential of nanopore sequencing, patents are classified by application:



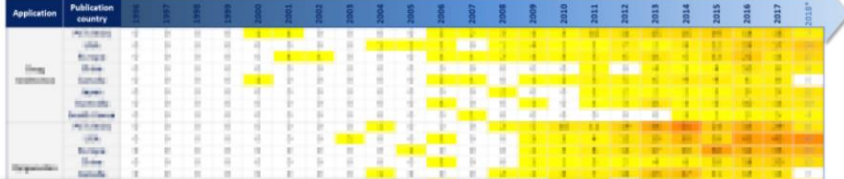
ANALYSIS BY APPLICATION

Time Evolution by Application



ANALYSIS BY APPLICATION

Time Evolution by Publication Country for Each Application



Useful patent database allows multi-criteria searches

GENERAL INFORMATION																	TECHNOLOGIES			APPLICATIONS									
FAMILY NUMBER (PANDA)	PATENT NUMBER	PATENT ASSIGNEE	PRIORITY DATE	TITLE	ABSTRACT	PDF LINK	LEGAL STATUS	ACTUAL OR EXPECTED EXPIRATION DATE	S1 PROTEIN MANOPO	S2 SOLID-STATE MANOPO	S3 HYBRID MANOPO	S4 DRUG RESISTANCE	S5 EPIGENETICS	S6 INFECTIOLOG	S7 MICROBIO	S8 ONCOLOGY	S9 PLANT	S10 PRENATAL DIAGNOSIS	S11 TRANSCRIPTOMICS	S12 WHOLE GENOME SEQUENCING									
703997	JP2001514739 JP2935509		1997-02-12	Method and product for analysis	Method and product for analysis	Open	EXPIRED	2018-02-11	X	0	0	0	0	0	0	0	0	0	0	0									
703997	OA2281205	CHANEUGENEY	1997-02-12	Method and product for analysis	Method and product for analysis	Open	LAPSED	2005-02-11	X	0	0	0	0	0	0	0	0	0	0	0									
703997	WO9835012 WO9835012	CHANEUGENEY	1997-02-12	Method and product for analysis	Method and product for analysis	Open	LAPSED	2000-08-12	X	0	0	0	0	0	0	0	0	0	0	0									
703997	EP1009902 EP1009902	CHANEUGENEY	1997-02-12	Method and product for analysis	Method and product for analysis	Open	EXPIRED	2018-02-11	X	0	0	0	0	0	0	0	0	0	0	0									
703997	AT273381	CHANEUGENEY	1997-02-12	Method and product for analysis	Method and product for analysis	Open	LAPSED	2005-02-15	X	0	0	0	0	0	0	0	0	0	0	0									
703997	DE49825601 DE49825601	CHANEUGENEY	1997-02-12	Method and product for analysis	Method and product for analysis	Open	EXPIRED	2018-02-11	X	0	0	0	0	0	0	0	0	0	0	0									
703997	CH1251603	Enogen	1997-02-12	Method and product for analysis	Method and product for analysis	Open	LAPSED	2005-04-20	X	0	0	0	0	0	0	0	0	0	0	0									
703997	IL156402	GENE & CH	1997-02-12	Method and product for analysis	Method and product for analysis	Open	LAPSED	2004-09-23	X	0	0	0	0	0	0	0	0	0	0	0									
703997	IL151332 IL151332	GENE & CH	1997-02-12	Method and product for analysis	Method and product for analysis	Open	LAPSED	2004-09-23	X	0	0	0	0	0	0	0	0	0	0	0									
703997	US20140199209	LIFETECHNOLOGIES	1997-02-12	Method and product for analysis	Method and product for analysis	Open	GRANTED	2020-05-20	X	0	0	0	0	0	0	0	0	0	0	0									
703997	US7456275 AUS170390 AU742888	US GENOMICS	1997-02-12	Method and product for analysis	Method and product for analysis	Open	EXPIRED	2004-09-23	X	0	0	0	0	0	0	0	0	0	0	0									
715146	US20020020458	INTERQUESS ENTERPRISES EMPIRE IP	1998-12-23	Sequencing method	The present invention	Open	LAPSED	2016-05-16	0	0	0	X	0	0	0	0	0	0	0	0									
715146	US2000039333	JONES ELIZABETH LOUISE	1998-12-23	Sequencing method	The present invention	Open	LAPSED	2002-06-23	0	0	0	X	0	0	0	0	0	0	0	0									
715146	EP1141399 EP1141399	JONES ELIZABETH LOUISE	1998-12-23	Sequencing method	The present invention	Open	LAPSED	2012-08-21	0	0	0	X	0	0	0	0	0	0	0	0									
715146	US20040076998	LEXOW FREDEN	1998-12-23	Sequencing method	The present invention	Open	LAPSED	2011-03-09	0	0	0	X	0	0	0	0	0	0	0	0									
715146	AU1881000 AU774399	LEXOW FREDEN	1998-12-23	Sequencing method	The present invention	Open	GRANTED	2019-12-23	0	0	0	X	0	0	0	0	0	0	0	0									
715146	ES2247848	LEXOW FREDEN	1998-12-23	Method and product for analysis	The present invention	Open	LAPSED	2012-02-06	0	0	0	X	0	0	0	0	0	0	0	0									
715146	NO996425 NO996425	LEXOW FREDEN	1998-12-23	Method and product for analysis	The present invention	Open	REVOKED	2004-09-27	0	0	0	X	0	0	0	0	0	0	0	0									
715146	NO20013130 NO20013130	LEXOW FREDEN	1998-12-23	Sequencing method	The present invention																								

ORDER FORM

Nanopore Sequencing

Patent Landscape Analysis – February 2019

Ref.:KM19002



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

☐ €6,490 – Corporate license

☐ €5,990 – Single 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.

**Single user license means only one person at the company can use the report. Please be aware that our publication will be watermarked on each page with the name of the recipient and of the organization (the name mentioned on the PO). This watermark will also mention that the 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. One user license: a single individual at the company can use the report.

2. Multi user license: the report can be used by unlimited users within the company. Subsidiaries are not included.

“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 IPR

6.1 All the IPR 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

WHAT WE DO

Knowmade helps customers to understand the **competitive landscape**, follow **technology trends**, and find out **opportunities** and **threats** in terms of **technology** and **patents**.

- Interpreting the **competitive landscape** and **technology developments** throughout **patents** and **scientific information**.
- Turning **patents** and **scientific information** into **business intelligence tools** that give you the capability to
 - Understand your **competitive environment**
 - Be ahead of **technology trends**
 - Identify patent & technology **opportunities**
 - Assess patent & technology **risks**
 - Define your **IP** and **R&D strategy**
 - Monetize your **technologies** and know-how
 - Defend your **business**
- Strong **technology expertise** with an in-depth **knowledge of patents**.
- Highly **specialized** analysts in the following sectors:
 - Electronics, Telecommunications and Photonics**
Compound semiconductors, Power electronics, Batteries, Memories, RF electronics, Wireless communications, Solid-state lighting & display, Photonics, MEMS Sensors & Actuators, Semiconductor manufacturing, Packaging & Assembly.
 - Life Sciences, Healthcare and Agri-Food**
Medical devices, Medical imaging, Microfluidics, Biotechnology, Pharmaceuticals, Food-processing

Patents
Technologies
Prior art
Scientific findings
Opportunities
Partners
Competitors
Newcomers
M&A targets



Patent landscape analysis
Scientific review
IP portfolio assessment
Patent valuation
Freedom-to-operate analysis
Litigation & licensing support
Patents linked to products
Technology scouting
Technology trends
Competitive IP landscape
Market trends
Reverse engineering

Make strategic decisions
Sustain competitive advantages
Speed R&D and enhance innovation process
Align R&D and IP with key business objectives
Strengthen IP portfolio and acquire technologies
Anticipate risks and defend core businesses
Explore new opportunities and monetize IP



WHAT WE PROPOSE



Patent Landscape Analysis
Patent-to-Product Mapping
Patent Portfolio Analysis
Patent Watch



Dedicated analyses

Tailor-made analyses to meet your business needs and budgetary constraints



Off the shelf reports and analyses



Workshops and trainings

Taylor made to respond your requests
Direct interaction between your team and our experts at your site



WHAT IS OUR ADDED VALUE

Patent Search

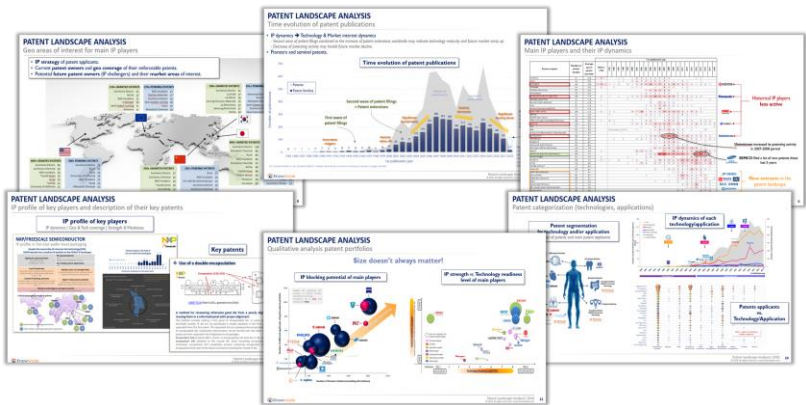
- ✓ **Strong technical expertise of our analysts with PhD degree**
 - Comprehensive search queries and keywords
 - Manual selection of relevant and related patents
 - Manual segmentation by technology & application

Analytics

- ✓ **State of the art statistical tools**
- ✓ **Innovative methodologies to deliver relevant IP analysis**
- ✓ **Business oriented data representation and graphics**

Results Analysis

- ✓ **Technical expertise**
 - Highly specialized analysts in your field
 - Benefit from knowledge capitalization
- ✓ **In-depth IP analysis combined with market data and reverse engineering ***
- ✓ **Customer support**



* Our partners



CUSTOM STUDY & CONSULTING

Tailor-made analysis to meet your needs and budgetary constraints

Prior art search

Evaluate the patentability of your invention in the course of a patent filing.
Invalidate competitor's patents in the course of patent litigation or in anticipation of one.
Make third-party observations concerning the patentability of competitor's inventions.

Patent landscape analysis

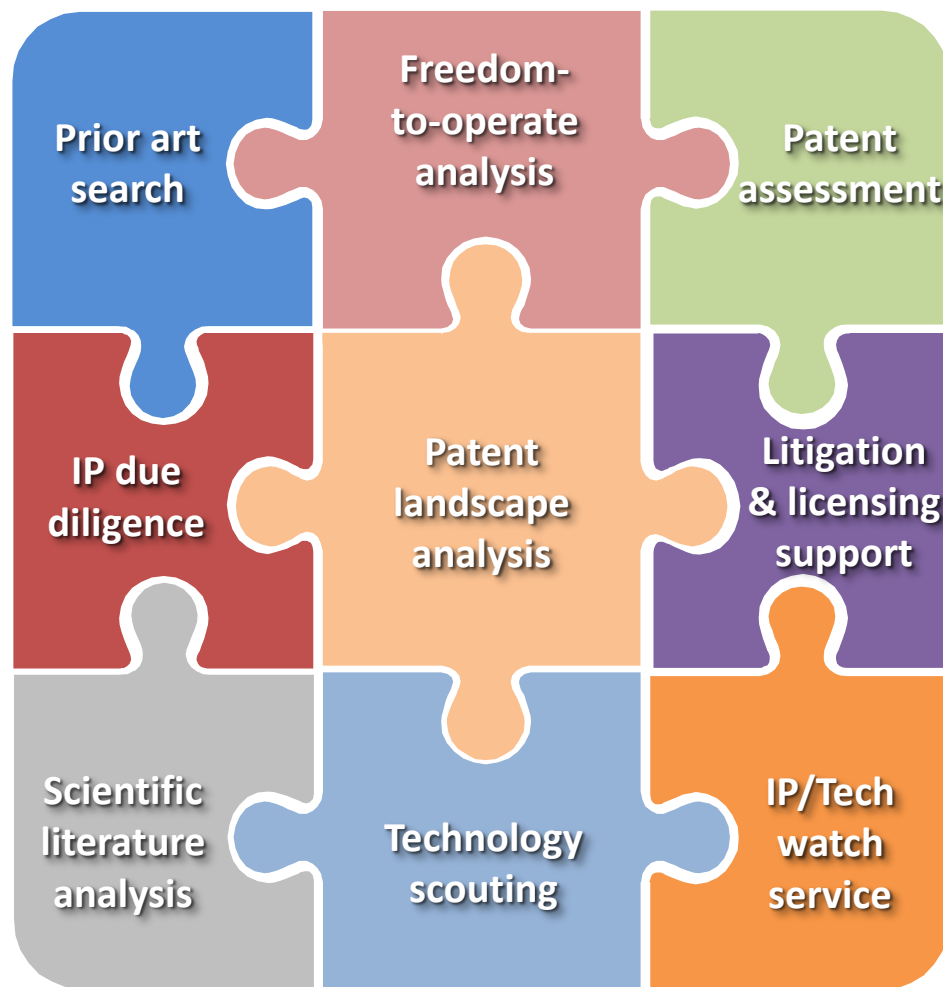
Understand the competitive environment and the technology trends from a patent perspective.
Identify key players, their IP strategy and their key patents.
Know IP collaborations, licensing agreements and litigation history.

Freedom-to-operate analysis

Assess the risks to infringe third-party patents.
Ensure that your products/processes can be safely manufactured, sold and used in specific countries without infringing patents held by others.

Litigation and licensing support

Evidence of infringement/non-infringement for offensive/defensive support.
Defend your position in licensing negotiation or patent litigation.



Patent assessment

Identify most valuable patents prior to patent acquisition/sales, licensing agreement, capital fundraising process, M&A or IP due diligence.
Estimate the financial value of your patent portfolio.

IP due diligence

Assess the patent portfolio of a company and reveal the SWOT matrix prior to patent acquisition/sale, licensing agreement or M&A.

Scientific literature analysis

Pinpoint key research findings and new emerging research fields, key laboratories and scientific experts, industrial/academic research collaborations, and identify prospective R&D partners.

Technology scouting

Identify, qualify and get access to external innovation.

IP & Technology watch service

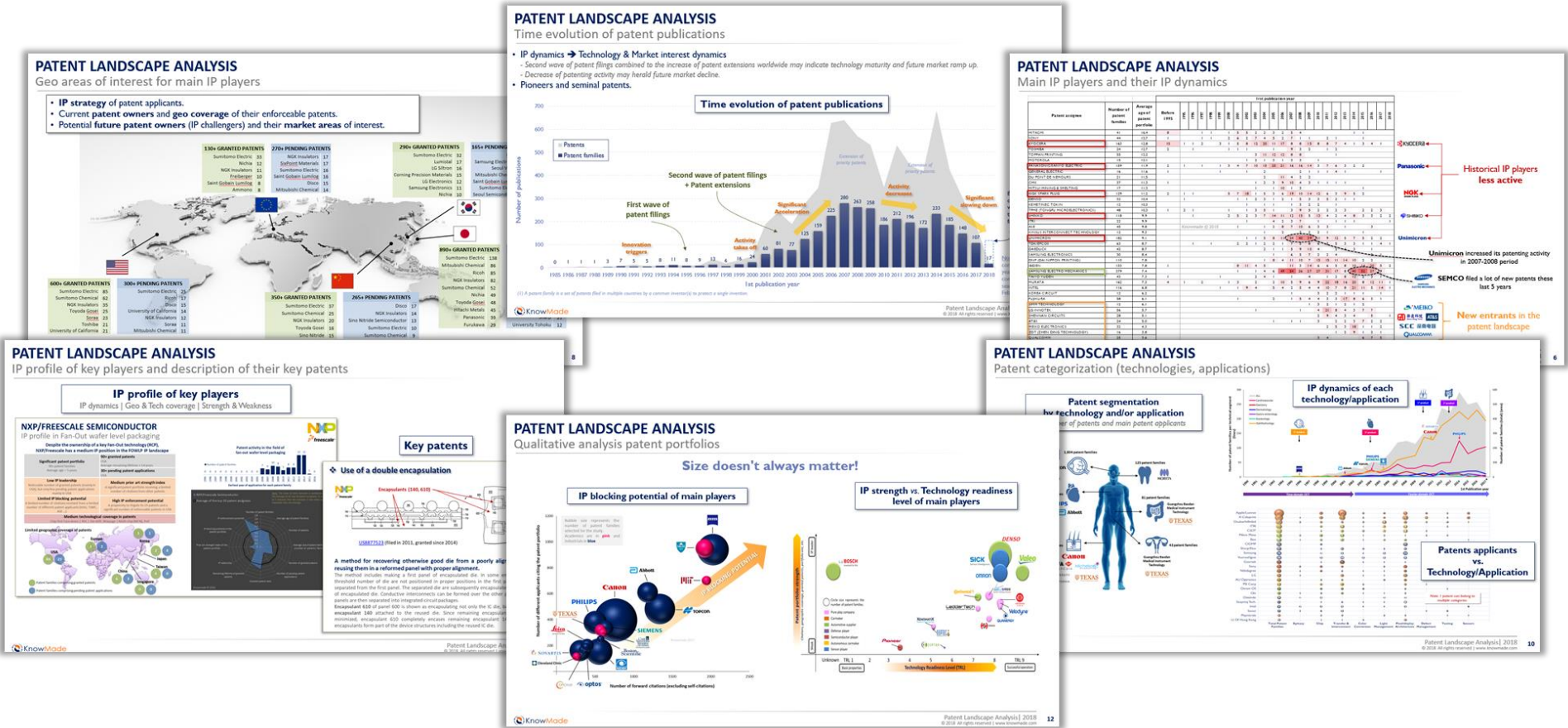
Follow IP/technology trends, keep a watch on your competitors and identify new entrants, anticipate the changes, early detect business opportunities and mitigate the risks.

OFF THE SHELF REPORTS

« Pre-packaged » analysis

Knowmade team of experts work all year long to collect patent and scientific information, identify and analyze the trends, the challenges, the emerging technologies, the competitive environments, and turn it into results to give you a complete picture of your industry landscape.

Every year, Knowmade publishes a comprehensive collection of reports in various technology fields. These fact-based analyses can provide you with the reliable information you need to advance your business and your competitive position.



OFF THE SHELF REPORTS

2019 reports collection

COMPOUND SEMICONDUCTORS

- **GaN-on-Silicon Substrate: Materials, Devices and Applications** – Patent Landscape 2019*
- **RF GaN: Materials, Devices and Applications** – Patent Landscape 2019*
- **Power SiC: MOSFETs, SBDs and Modules** – Patent Landscape 2019*
- **Power GaN: Materials, Devices and Applications** – Patent Landscape 2019*
- **Patent Trolls in the Semiconductor Market** – Litigation Risk and Potential Targets 2017

POWER ELECTRONICS

- **Power SiC: MOSFETs, SBDs and Modules** – Patent Landscape 2019*
- **Power GaN: Materials, Devices and Applications** – Patent Landscape 2019*
- **Fast Charging Technologies** – Patent Landscape 2019*
- **Wireless Power Charging** – Patent Landscape 2017

BATTERY AND ENERGY MANAGEMENT

- **Solid-State Batteries** – Patent Landscape 2019*
- **Battery Energy Density Increase** – Patent Landscape 2019*
- **Status of the Battery Patents** – Patent Landscape 2018
- **NMC Li-ion Batteries** – Patent Landscape 2017

RF DEVICES & TECHNOLOGIES

- **Antenna for 5G Wireless Communications** – Patent Landscape 2019*
- **RF Filter for 5G Wireless Communications** – Patent Landscape 2019*
- **RF GaN: Materials, Devices and Applications** – Patent Landscape 2019*
- **RF Front End Module for Cellphones** – Patent Landscape 2018
- **RF Acoustic Wave Filters: SAW, FBAR, SMR-BAW** – Patent Landscape 2017

PHOTONICS & OPTOELECTRONICS

- **Silicon Photonics for Data Centers: Optical Transceiver** – Patent Landscape 2019*
- **VCSEL** – Patent Landscape 2018
- **LiDAR for Automotive** – Patent Landscape 2018

DISPLAY

- **MicroLED Displays** – Patent Landscape 2018

IMAGING

- **Facial & Gesture Recognition Technologies in Mobile Devices** – Patent Landscape 2019*
- **VCSEL** – Patent Landscape 2018
- **LiDAR for Automotive** – Patent Landscape 2018
- **iPhone X Proximity Sensor and Flood Illuminator** – Patent-to-Product Mapping 2018

MEDICAL IMAGING & BIOPHOTONICS

- **Optical Coherence Tomography Medical Imaging** – Patent Landscape 2018
- **Biomedical Photoacoustic Imaging** – Patent Landscape 2015

SEMICONDUCTOR MANUFACTURING & PACKAGING

- **Hybrid Bonding for 3D Stack** – Patent Landscape 2019*
- **Fan-Out Wafer/Panel Level Packaging** – Patent Landscape 2019*
- **Fan-Out Wafer Level Packaging** - Patent Landscape 2016

MEMORY

- **Magnetoresistive Random-Access Memory (MRAM)** – Patent Landscape 2019*
- **3D Non-Volatile Memories** – Patent Landscape 2018
- **Patent Trolls in the Semiconductor Market** – Litigation Risk and Potential Targets 2017
- **TSV Stacked Memories** – Patent Landscape 2016

MEMS & SENSORS

- **MEMS Foundry Business IP Portfolio** – Patent Portfolio Analysis 2019*
- **Miniaturized Gas Sensors** – Patent Landscape 2019*
- **LiDAR for Automotive** - Patent Landscape 2018
- **iPhone X Proximity Sensor and Flood Illuminator** - Patent-to-Product Mapping 2018
- **RF Acoustic Wave Filters** - Patent Landscape 2017
- **Knowles MEMS Microphones in Apple iPhone 7 Plus** - Patent-to-Product Mapping 2017
- **Consumer Physics SciO Molecular Sensor** - Patent-to-Product Mapping 2017

BIOMEMS & MEDICAL MICROSYSTEMS

- **3D Cell Printing** – Patent Landscape 2019*
- **Circulating Tumor Cells Isolation** – Patent Landscape 2019*
- **Nanopore Sequencing** - Patent Landscape 2019*
- **Microfluidic Manufacturing Technologies** – Patent Landscape 2019*
- **Pumps for Microfluidics** - Patent Landscape 2017
- **Microfluidic Technologies for Diagnostic Applications** - Patent Landscape 2017
- **Fluidigm** - Patent Portfolio Analysis 2017
- **Non-Invasive Glucose Monitoring** - Patent Landscape 2015

BIOTECHNOLOGY & PHARMACEUTICS

- **Personalized Medicine** – Patent Landscape 2019*
- **3D Cell Culture Technologies** – Patent Landscape 2016

* Coming soon

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