

## Leveraging Patent Analysis for Innovative Smart Water Grid Solutions

Ahmed Fatimi

ERSIC, Department of Chemistry, FPBM, Sultan Moulay Slimane University, Beni Mellal 23000, Morocco

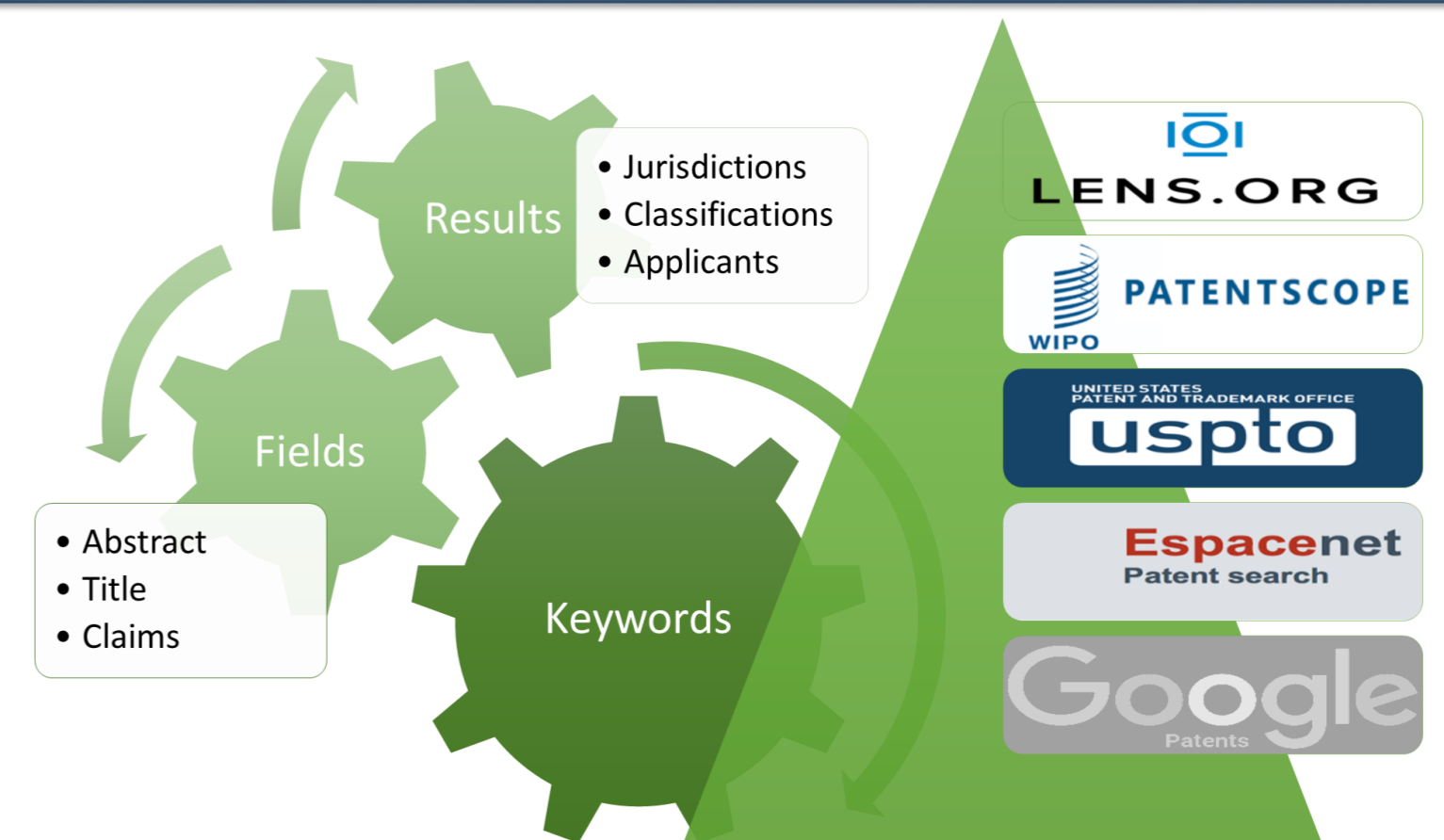
### INTRODUCTION

- The "Smart Water Grid" refers to the application of advanced technologies to water distribution systems, aiming to improve efficiency, sustainability, and resilience.
- Smart water grids are a combination of the internet of things and information and communications technologies that aim to improve the monitoring, management, and efficiency of water distribution systems.
- These systems involve the use of sensors, data transmission, and system controls to address various challenges such as water leaks, overuse, quality issues, and responses to droughts and natural disasters.
- Inventions, though patents, could propose thousands of solutions to such barriers and problems in this area.
- Patent analysis as a powerful tool for technology monitoring can be leveraged for patent inspiration in several ways, such as identifying emerging technologies and trends, studying competitor strategies, leveraging prior art, and so on.

### AIM

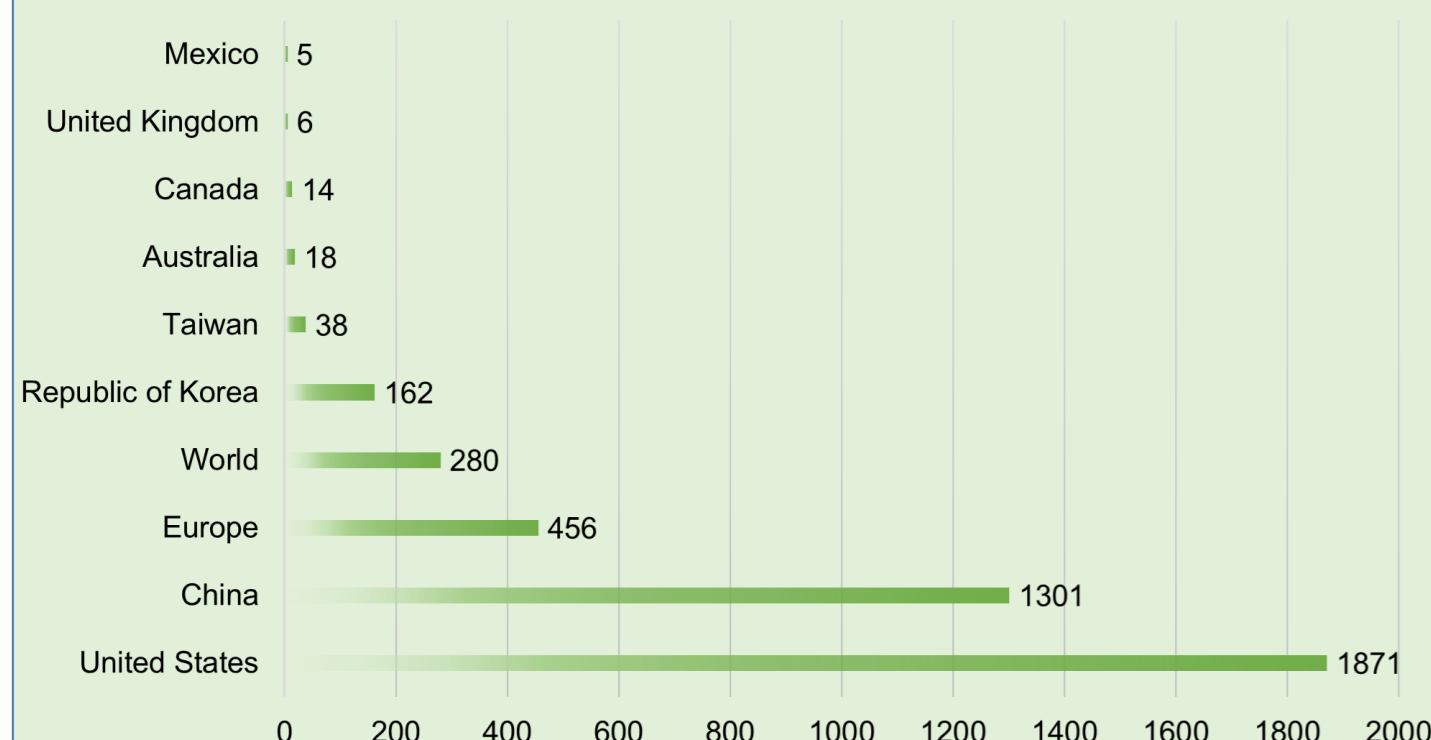
- In this study, a patent analysis related to smart water grids is proposed.
- Based on jurisdictions, classifications, and applicants, an overview is given by answering specific questions, such as those relating to patterns of patenting for smart water grids: where, what is filed, and who files patent applications?

### METHOD



### RESULTS & DISCUSSION

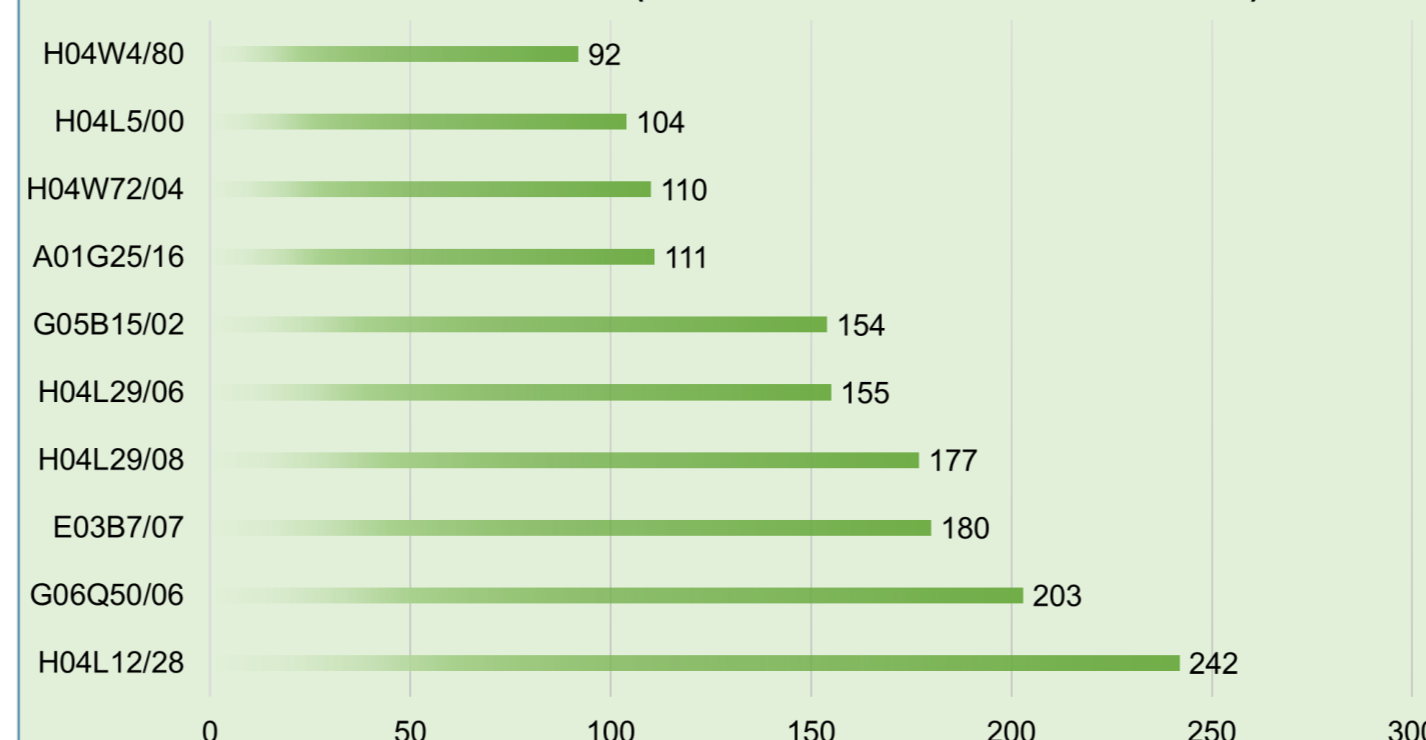
#### MAIN JURISDICTIONS



#### WHERE?

- This indicates that the **United States** and **China** are the primary arenas for innovation in this field, likely driven by strong R&D investments and market demand in both regions.

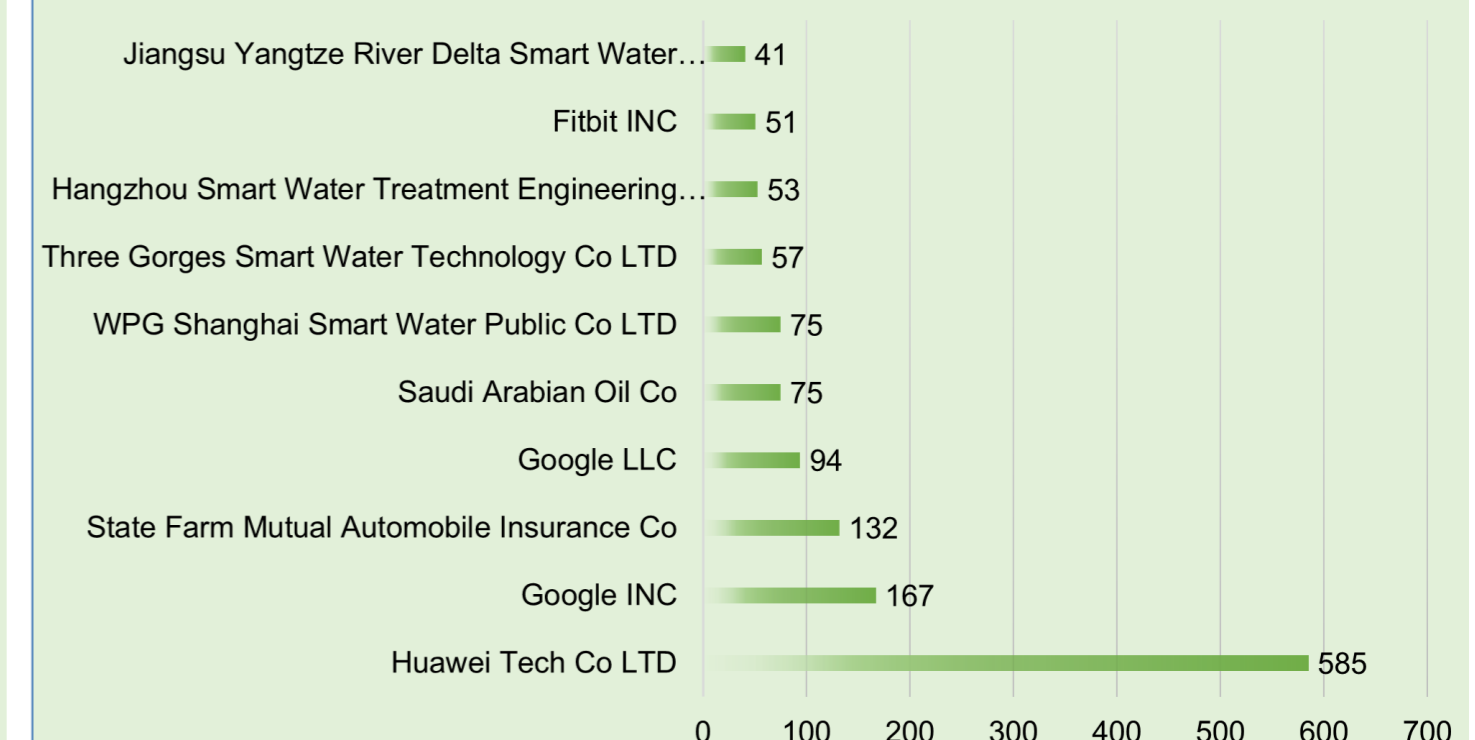
#### CORE TECHNOLOGIES (PATENT CLASSIFICATION CODES)



#### WHAT?

- **H04L12/28** (*Data Switching Networks*) is the most frequently used classification, suggesting that efficient communication systems are a key focus for smart water grids.
- **G06Q50/06** (*Data Processing for Administrative or Financial Purposes*) and **E03B7/07** (*Water Supply and Distribution*) also have a high number of filings, reflecting the dual importance of both digital and physical infrastructure.
- Other classifications (**H04L29/08**, **H04L29/06**) highlight the role of digital transmission and control protocols in these systems.

#### KEY APPLICANTS



#### WHO?

- This shows a mix of tech giants, such as **Google** and **Huawei**, and industry-specific companies like **Saudi Arabian Oil** and **WPG Shanghai Smart Water Public Co LTD**, highlighting the broad range of industries involved in smart water grid technology.
- Companies from **China** and the **United States** dominate the innovation landscape, particularly tech giants like **Huawei** and **Google**, indicating a convergence of traditional water management with advanced information technology infrastructure.

### CONCLUSION

- This study highlights the global distribution of patent filings and the leading companies and technologies involved in smart water grid innovation.
- The patent data reveals a focus on communication and control technologies as well as data transmission and processing (as reflected by the dominant patent classifications) within the smart water grid space, highlighting the importance of communication technologies in this field.
- In short, smart water grid innovation is driven by the integration of efficient water management, with a global focus led by the United States and China.

### REFERENCES

1. Mutchek, M.; Williams, E. Moving Towards Sustainable and Resilient Smart Water Grids. *Challenges* **2014**, *5*, 123-137.
2. Cheong, S.-M.; Choi, G.-W.; Lee, H.-S. Barriers and Solutions to Smart Water Grid Development. *Environmental Management* **2016**, *57*, 509-515.
3. Giudicianni, C.; Herrera, M.; Nardo, A.d.; Adeyeye, K.; Ramos, H.M. Overview of Energy Management and Leakage Control Systems for Smart Water Grids and Digital Water. *Modelling* **2020**, *1*, 134-155.