



# TECHNOLOGY TRENDS

## Trying to see into the future

Hay Geraedts  
June 2021

# Content of the presentation



- What is trend analysis?
- What are trend analysis methods?
- Where to find trend data?
- Finding 'innovational' topics through reading technology trends
- How to set up a trend analysis for the I<sup>2</sup>E<sup>2</sup> innovation project?

# What is trend analysis?

- An analysis to investigate what happened in the past up till now to extrapolate to have a picture of what most likely can happen in that future.
- Result of a trend analysis is telling you in what direction you can develop your innovation in order to be able to decide, within borders of having a certain confidence, to invest in an entrepreneurial development or not.

**But,.....** There is a dilemma

*Tushman:*

*"Decision by itself changes nothing."*

*At the moment decisions are made, we don't know their effects.*

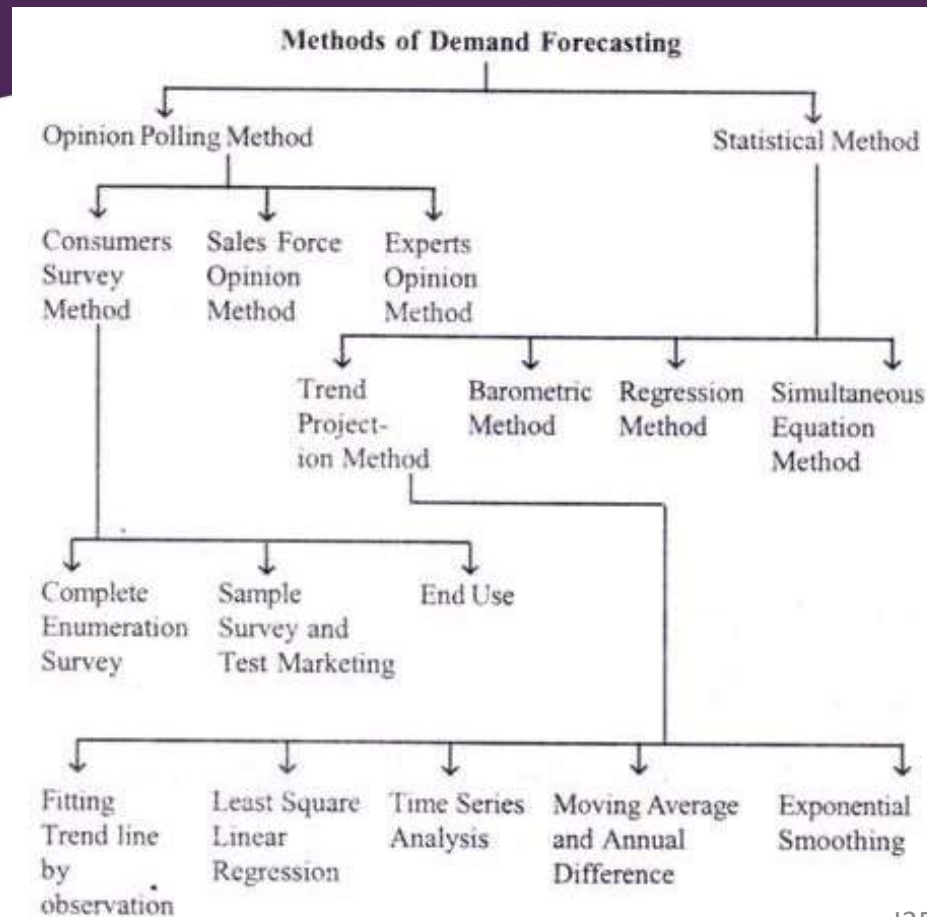
***We spent far more time on the consequences."***

# What are trend analysis methods?

- Trend analysis by statistics
- Trend analysis by mathematically extrapolating
- Trend analysis by studying innovation databanks (IP-databanks: ESPACENET, patent inspiration tool)
- Trend analysis by being informed by futurists
- Trend analysis by following conferences where latest developments are being presented.

# What are trend analysis methods?

## Trend analysis by statistics



# What are trend analysis methods?

Trend analysis by mathematically extrapolating

## Excel TREND function

The Excel TREND function is used to calculate a linear trend line through a given set of dependent y-values and, optionally, a set of independent x-values and return values along the trend line.

Additionally, the TREND function can extend the trendline into the future to project dependent y-values for a set of new x-values.

The syntax of the Excel TREND function is as follows:

```
TREND( known_y's, [known_x's], [new_x's], [const])
```

**Where:**

**Known\_y's (required)** - a set of the dependent y-values that you already know.

**Known\_x's (optional)** - one or more sets of the independent x-values.

- If only one x variable is used, known\_y's and known\_x's can be ranges of any shape but equal dimension.
- If several x variables are used, known\_y's must be a vector (one column or one row).
- If omitted, known\_x's is assumed to be the array of serial numbers {1,2,3,...}.

**New\_x's (optional)** - one or more sets of new x-values for which you want to calculate the trend.

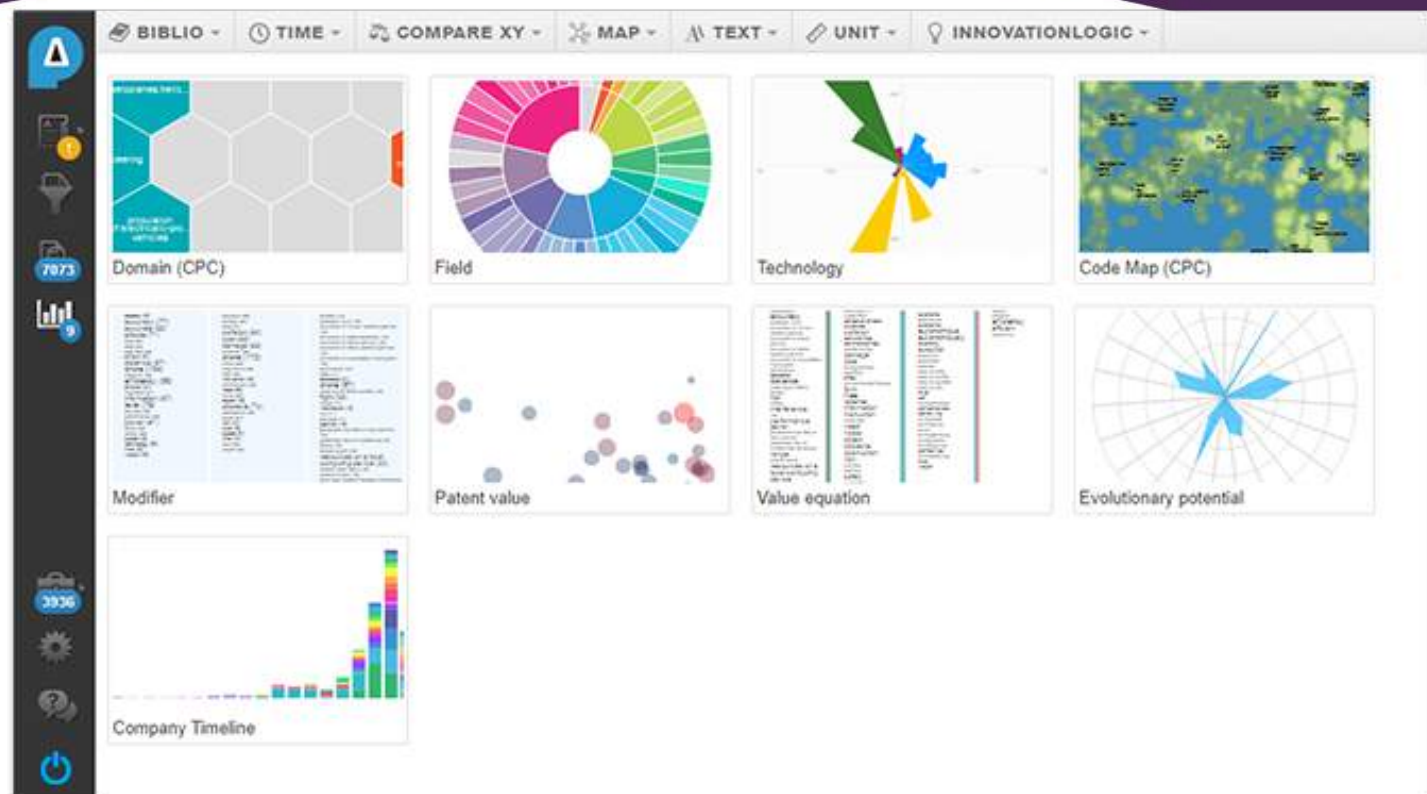
- It must have the same number of columns or rows as known\_x's.
- If omitted, it is assumed to be equal to known\_x's.

**Const (optional)** - a logical value specifying how the constant  $a$  in the equation  $y = bx + a$  should be calculated.



# What are trend analysis methods?

Trend analysis by studying innovation databanks (IP-databanks: ESPACENET, patent inspiration tool)



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Inventor	Applicant	EC	IPC	Publication info	Priority date
WESTERKAMP EDWARD (US)	BLOEMER MEIER & WESTERKAMP LLC (US)	A61D9/0028 H02C3/10 (+1)	F16M11/08 H02K3/30	US2011210524 (A1) 2011-09-01	2006-10-25
CURSEL KLAUS (DE)	SCHAEFFLER TECHNOLOGIES GMBH	F16D13/02 F16D13/70	F16D13/02	US2011210993 (A1) 2011-09-01	2008-11-03
PHILLIS ALEXANDROS (US)	METHODE ELECTRONICS INC (US)	H02G7/14B38	H02G7/00	US2011211004 (A1) 2011-09-01	2008-03-27
JOHNSON MARK D (US)	MATTER LOCK CO (US)	E05B37/08	E05B55/02	US2011210908 (A1) 2011-09-01	2010-03-01

# What are trend analysis methods?

Trend analysis by being informed by futurists

<https://faithpopcorn.com/trendbank/>

## Consumer trends



### COCOONING

The need to protect oneself from the harsh, unpredictable realities of the outside world.



### FUTURETENSE

Consumers, anxiety-ridden by simultaneous social, economic, political and ethical chaos, find themselves beyond their ability to cope with today or imagine tomorrow.



### SAVE OUR SOCIETY

The world rediscovers a social conscience of ethics, passion and compassion.





<https://jimcarroll.com> › Vertaal deze pagina

## Jim Carroll

ABOUT JIM CARROLL ... Jim is the world's leading global futurist, keynote speaker, business trends, and transformation expert, recognized worldwide for his ...

<https://www.pewresearch.org> › inno... › Vertaal deze pagina

## 1. The innovations these experts predict by 2030 | Pew ...

30 jun. 2020 — Ironically, it will be **technology** that enables this **trend**, and premiums will be paid for uninterrupted time to focus or to simply enjoy being alive.

<https://www.linkedin.com> › pulse › t... › Vertaal deze pagina

## Top 3 Technology Trends For 2030 - LinkedIn

28 apr. 2020 — Speed: Internet speed, mobile & computing speed will continue to dramatically increase. With 5G mobile, we will be able to surf the internet at 10x ...

<https://www.rolandberger.com> › publication\_pdf › PDF

## Roland Berger Trend Compendium 2030

door R Berger · 2017 · Geciteerd door 23 — 4. Roland Berger **Trend Compendium 2030 - Trend 5** Dynamic **technology** and innovation.pptx. It covers seven **megatrends** that shape the future development of .

<https://marketbusinessnews.com> › te... › Vertaal deze pagina

## Technology Trends 2021 – Fast Forward to 2030 - Market ...

2 mrt. 2021 — **Technology Trends 2021 – Fast Forward to 2030**. With the second wave of coronavirus ravaging most countries in the world, it seems like 2021 ...

<https://www.smart-energy.com> › fiv... › Vertaal deze pagina

## Five emerging trends to drive technology innovation through ...

16 sep. 2020 — Top 5 emerging **trends** driving **technology** innovation through **2030** · TAGS · artificial intelligence · digital twins · digitisation · innovation · machine ...

<https://cult.honeypot.io> › reads › 20... › Vertaal deze pagina

## Tech's "Next Big Thing": 20 Technologies and Innovations to ...

19 jul. 2020 — A comprehensive list of **tech** predictions from 2022 to **2030**. ... The **trend** of AI in our homes is already ongoing, and will only accelerate over the ...

<https://www.dnv.com> › News › Vertaal deze pagina

## Technology Outlook 2030: The ten technology trends and their ...

3 dec. 2019 — DNV GL's Technology Outlook **2030** is focusing on five **technology trends** that are transformative in key industries: transport and logistics, energy, ...

<https://www.ericsson.com> › reports › Vertaal deze pagina

## 10 Hot Consumer Trends 2030 – The internet of senses ...

10 Hot Consumer **Trends 2030** · Welcome to the internet of senses · **Trend 1**: Your brain is the user interface · **Trend 2**: Sounds like me · **Trend 3**: Any flavor you want.

<https://www.forbes.com> › 2020/04/20 › Vertaal deze pagina

## These 25 Technology Trends Will Define The Next Decade

20 apr. 2020 — 1. Artificial intelligence (AI) and machine learning. · 2. The Internet of Things (IoT). · 3. Wearables and augmented humans. · 4. Big Data and ...

<https://www.cloudflight.io> › technol... › Vertaal deze pagina

## Technology Trends 2021 - Fast Forward to 2030 – Cloudflight

People & Society – 2021 is the new **2030** · Economy and the environment – Losers react, winners drive innovation · Software landscape overall – tough times for ...

<https://futurecio.tech> › 5-trends-to-d... › Vertaal deze pagina

## 5 trends to drive tech innovation through 2030 - FutureCIO

24 aug. 2020 — 5 **trends** to drive **tech** innovation through **2030** ... Gartner lists emerging technologies like social distancing technologies, composable enterprise, ...

# What are trend analysis methods?

Trend analysis by being informed by futurists



**“Some people see a trend, and see a threat. Innovators see the same trend, and see an opportunity.”**

**Jim Carroll**





<https://jimcarroll.com>



JIM CARROLL

Futurist, Keynote Speaker, Business Trends & Leadership Expert



ABOUT

WHY JIM

KEYNOTES

HIGHLIGHTS

INSIGHT

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# Futurist Jim Carroll Disruptive Trend & Innovation Expert Post-Covid Future Insight

"I align you to your accelerating future by providing you with specific industry trends and leadership insight delivered in a compelling and motivational style!"  
– Jim Carroll

Clients Around The Globe



See Jim in action



POST-COVID FUTURE

VIRTUAL EVENTS

ASK A FUTURIST!

"We invited Jim in to give us an assessment of how our industry will change over the next 10 years. We have never seen a more compelling, concise – and motivating – assessment!"



Mercedes-Benz





## Much of the world has **‘gone up’**

One consequence of mass urbanization is that you only have so much space to place people and the infrastructure that goes with it. Two solutions: *dig down*, or *build up*.

We'll see more of the latter as various groups figure out how to capitalize on new, innovative thinking with 'skyscraper' technology.

Consider it in the context of vertical farming — we will see the emergence of a new profession of 'vertical farming infrastructure managers.'

Big, tall buildings involving innovative new ideas will be one of the business growth stories in the years before 2025.

<https://jimcarroll.com/wp-content/uploads/2015/01/25-Trends-for-2025>

I2E2 Trend Analysis workshop



## Micro nationals **dominate global markets**

The most successful, disruptive business organizations will consist of a small nucleus of people, focused on goals, ideas, innovation and strategy. They'll instantly decide to enter a new market, engineer a new product, or transform a concept into a radical new business model.

They'll do so by having mastered the skill of going out and assembling the right skills at the right time, for the right purpose, at the most optimal cost. They will have obliterated the slumbering, slow-moving multinational organizational structure that seemed to serve its purpose so well up to the early part of the 21st century. Think BIG. Be small!





## Re-generative energy technology is everywhere: **it's transformative, storable, re-usable**

Most energy use is no longer based on a 'one-time' use; instead, most of the energy consumption in the world comes from re-generative devices.

We will have seen a gradual but steady decline in the use of carbon and other such energy sources which can only be used once, and then disappears.

There will be lots of bicycles with hydraulics that store energy while going downhill; homes that create energy from static generated from people walking on a new type of intelligent floor covering; lights that use special reflectors to re-send the beam back to an in-bulb mirror that makes just a little bit more energy.

Every photon counts!

2021

<https://jimcarroll.com/wp-content/uploads/2015/01/25-Trends-for-2025>

I2E2 Trend Analysis workshop

## Crowd thinking has replaced **most forms of peer research**

Most long established medical and science journals have transitioned and have accepted "instant crowd thinking" as the best way to evaluate the new world of hyper-science.

In an instant, a researcher can summon a crowd of vetted, quality specialists who have niche knowledge in a rapidly changing field. The result? An acceleration in the pace of discovery of new ideas and concepts.

The impact? Massive velocity in the development of new technologies, pharmaceuticals, medical devices and forms of treatment, agricultural concepts and methodologies.

Every industry and profession has seen a profound shift bigger than the once amazing macro-knowledge burst of the Manhattan project.





# Finding 'innovational' topics through reading technology trends

- On internet you can find trend information, with which you can interpret interesting entrepreneurial topics for innovation.
- Find what are the technological translations of the trends descriptions.
- Interpret whether this would fit into your company/I<sup>2</sup>E<sup>2</sup> project.
- See, holistically, what is the information needed to do the research within the given time.
- Set up a tactical plan of approach in order to see if the job can be done.

<https://www.forbes.com/sites/bernardmarr/2020/04/20/these-25-technology-trends-will-define-the-next-decade/?sh=75eab71629e3>

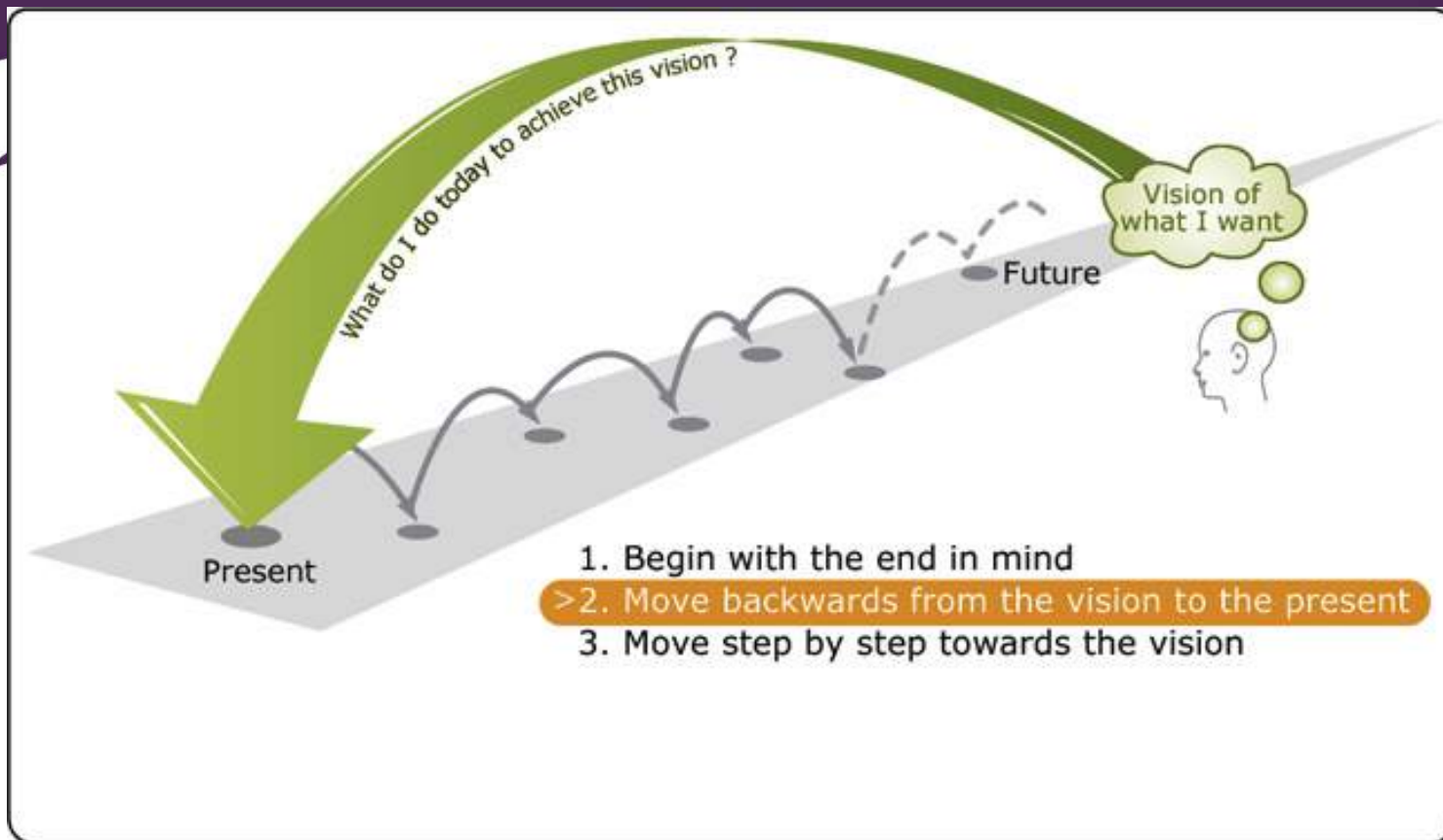
## These 25 Technology Trends Will Define The Next Decade



1. **Artificial intelligence (AI) and machine learning.** The increasing ability of machines to learn and act intelligently will absolutely transform our world. It is also the driving force behind many of the other trends on this list.
2. **The Internet of Things (IoT).** This refers to the ever-growing number of “smart” devices and objects that are connected to the internet. Such devices are constantly gathering and transmitting data, further fueling the growth in Big Data and AI.
14. **Autonomous vehicles.** The 2020s will be the decade in which autonomous vehicles of all kinds – cars, taxis, trucks, and even ships – become truly autonomous and commercially viable.
19. **Drones and unmanned aerial vehicles.** These aircraft, which are piloted either remotely or autonomously, have changed the face of military operations. But the impact doesn’t stop there – search and rescue missions, firefighting, law enforcement, and transportation will all be transformed by drone technology. Get ready for passenger drones (drone taxis), too!
22. **Robotic process automation.** This technology is used to automate structured and repetitive business processes, freeing up human workers to concentrate on more complex, value-adding work. This is part of a wider shift towards automation that will impact every industry.
24. **3D and 4D printing and additive manufacturing.** Although this may seem low-tech compared to some of the other trends, 3D and 4D printing will have very wide applications – and will be particularly transformative when combined with trends like mass-personalization.

# Backcasting

<https://www.naturalstep.ca/backcasting>



## Finding new emerging trends through conferences/symposia

- In conferences research centres, Universities and companies present their newest developments

## What is.....

- A **symposium** is a **meeting** to discuss a particular subject and collection of papers for that certain subject.
- A **seminar** is organized to discuss a particular topic. They are usually educational in nature and attendees are expected to gain new knowledge or skills at the end of the seminar
- A **workshop** is more of a hands-on experience for participants with demonstrations and activities; the amount of time one speaker addresses the group is limited
- A **round-table** conference is a get-together of peers to exchange thoughts and opinions on a certain topic, usually political or commercial, few are technical. There are a limited number of participants who sit at a round table, so that each one can face all the others



## What is.....

- An **academic conference** is a gathering of scientists or academia's, where research findings are presented.
- A **business conference** is held for people working in the same company or industry. They come together to discuss new trends and opportunities pertaining to the business
- Most conferences have one or more **keynote speakers**. These are common at academic and business conferences. The speakers chosen are eminent personalities in the related field and they present some latest discoveries.

## Why should you present your latest developments in conferences?



- Of course, when you want to acquire a Patent you wait until the patent is safely awarded.
- In conferences you can find new partners in business or new customers
- By showing your latest interesting developments, your company is probably seen as a potential company to work with, or to be chosen as problem shooter by potential clients
- It is a image builder for your company but also a image builder for you as an Innovation Engineer person.

# Finding interesting conferences

- Of course check by title of conference.
- But also check what is the program of the conference. Are there interesting topics for you?
- Also check who are the participants. Who are the keynote speakers and who has attended for this conference.
  - Maybe there are some competitors of your company. (Try to find out what they are doing, how do they solve problems in the field of your work)
  - Maybe there are some interesting companies to which you can offer your services.



University of  
Applied Sciences

<https://conferencemonkey.org/search?engineering=engineeringbusiness,engineeringdesign&conference=conference-conference>



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SpliTech2021

Between 1 Sep and 4 Sep in Split, Croatia

Conference (Online)

IISES 12th Business & Management Conference, Ur

Between 15 Sep and 16 Sep in Prague, Czechia

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SpliTech2021

Between 1 Sep and 4 Sep in Split, Croatia

Conference

5th International Conference on Advanced Technologies in Design, Mechanical and Aeronautical Engineering (ATDMAE 2021)

Between 25 Aug and 27 Aug in Amsterdam, Netherlands

ATDMAE



# Some conferences on topic of earlier Innovation Engineering projects

**The Top 100 Drone Companies to Watch in 2020**

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- CHAPTER 1: The Top 100 Drone Companies to Watch in 2020
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- CHAPTER 7: Funders
- CHAPTER 8: Drone Delivery
- CHAPTER 9: Drone Racing
- CHAPTER 10: Drone Conferences & Events
- CHAPTER 11: STEM & Education

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**Energy Storage World Forum**

13th Energy Storage World Forum + Residential 6th Energy Storage Forum  
25-27 November 2020 (online)

14th Energy Storage World Forum + Residential 7th Energy Storage Forum  
Berlin, 17 - 21 May 2021 (on-site)

Upcoming Energy Storage Events

**13th Energy Storage World Forum**  
**6th Residential Energy Storage Forum Speakers**  
**25-27 November 2020**

**ICFSP 2020: 14. International Conference on Food Safety and Preservation**  
October 21-22, 2020 in Barcelona, Spain

Conference Code: 2020ICFSP

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The International Research Conference Aims and Objectives

The International Research Conference is a federated organization dedicated to bringing together a significant number of diverse scholarly events within the conference program. Events will run over a span of time during the conference depending on the number and length of the presentations. With its high quality, it provides an exceptional value for students, academics and industry researchers.

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**Nov. 10-12, 2020 - Formnext 2020**

Events Previous Industries

Conferences / 2020 / December 2020 in Amsterdam / Cloud Systems, Technologies and Applications for Smart City Applications

**ICCSTASCA 2020: 14. International Conference on Cloud Systems, Technologies and Applications for Smart City Applications**  
December 03-04, 2020 in Amsterdam, Netherlands

Conference Code: 20NL12ICCSTASCA

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**The International Research Conference Aims and Objectives**

The International Research Conference is a federated organization dedicated to bringing together a significant number of diverse scholarly events for presentation within the conference program. Events will run over a span of time during the conference depending on the number and length of the presentations. With its high quality, it provides an exceptional value for students, academics and industry researchers.

**MICRO2020**  
**INTERNATIONAL CONFERENCE**  
23-27 NOVEMBER 2020 LANZAROTE AND BEYOND\*

**FATE AND IMPACTS OF MICROPLASTICS: KNOWLEDGE AND RESPONSIBILITIES**

\*Given the current uncertainty about the COVID-19 pandemic for this coming November 2020, our biannual international conference will be held during the originally planned dates 23-27 Nov. 2020. It will be substantially online-based with several in-person meeting nodes.

**8th Annual Medical Device Sterilization Conference**  
October 19-21, 2020 | Virtual Event

**EVERYTHING ABOUT WATER**

**VIRTUAL EXPO & CONFERENCE 2020**

**03-05 DECEMBER 2020**

Bonding The Water Community Together

I2E2 Trend Analysis workshop



# HOW TO USE TREND ANALYSIS IN YOUR I2E2 PROJECT

1. Patents search: showing latest developments
2. Consumer products: check on internet or in books (e.g. “Clicking”)
3. Read technical trends information and build your own perception
4. What in this trend information may be useful for your project?
5. What are interesting conferences to or acquire information from
6. Investigate and develop from these insights to a innovative product

# Questions?

A online meeting will be organized for  
you to ask questions to the teacher to  
be answered

