**The Power of Metadata: Structural Topic Modelling for Bibliometric Studies in Technology and Innovation Management**

Topical bibliometric studies within the Technology and Innovation Management research area

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Abstract

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# Introduction

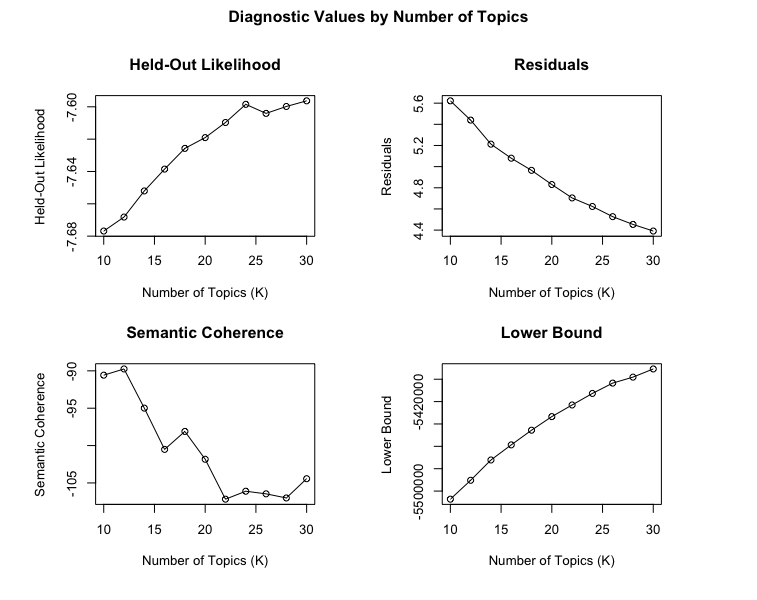
# Methods and Data

## Bibliometric Analysis

## Structural Topic Modelling

## Data

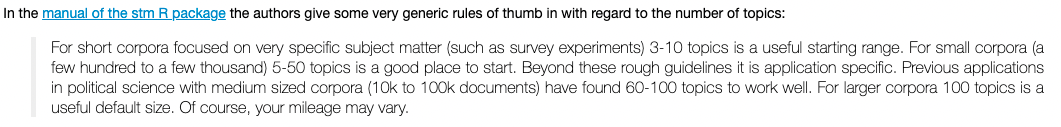
# Results



Chart, line chart

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Topic Numbers to consider: c(22, 24, 26, 28)



Chart, scatter chart

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Choose Mod24

Diagram, engineering drawing, timeline

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Each topic has no relation or very little relation with several documents – perhaps just take a closer look at Topic 2, 7 and 8.

Calendar

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We see here that document 22 is strongly associated with topic 15 and document 26 with topic 9, whereas documents 11 or 21 are more mixed



A picture containing table

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Bar chart

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Graphical user interface, application, table, Excel

Description automatically generated Graphical user interface, application, table, Excel

Description automatically generated

Timeline

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Chart, bar chart

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Text

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Topic 1 Top Words:

Highest Prob: manufacturing, quality, supply, management, chain, control, production, industry, process, performance

FREX: chain, supply, supplier, manufacturing, automotive, lean, audit, tqm, quality, control

Lift: (tqm), metals,, qfd, chain, tqm, (sscm), chains., oem, scm, audit

Score: supply, chain, manufacturing, quality, control, tqm, supplier, lean, automotive, production

Topic 2 Top Words:

Highest Prob: business, management, knowledge, strategic, competitive, value, model, organizational, corporate, strategy

FREX: business, corporate, competitive, knowledge, advantage, strategic, organization., value, company's, global.

Lift: fachmedien, hypercompetitive, logically, options-based, basically,, csr, managed,, organizations:, scorecard, define,

Score: business, knowledge, competitive, strategic, corporate, organizational, companies, value, organizations, chapter

Topic 3 Top Words:

Highest Prob: digital, data, technologies, smart, big, platform, 2020, new, transformation, intelligence

FREX: digital, 4.0, blockchain, big, smart, digitalization, analytics, artificial, platform, platforms

Lift: 4.0, analytics., digital, ai-based, blockchain, digitalized, iot, retailing, retailing,, retailing.

Score: digital, smart, big, blockchain, data, 4.0, analytics, platform, retail, digitalization

Topic 4 Top Words:

Highest Prob: innovative, development, economic, management, main, research, article, activity, innovations, analysis

FREX: russian, activity, innovative, economy, formation, regional, economic, competitiveness, indicators, activity.

Lift: expediency, federation,, kazakhstan,, russias, sphere,, czech, sphere, kazakhstan, kazakhstan., russian

Score: russian, innovative, economic, economy, russia, regional, activity, oil, innovation, competitiveness

Topic 5 Top Words:

Highest Prob: management, system, construction, enterprise, development, based, paper, technology, model, technology,

FREX: construction, forward, enterprise, algorithm, trans, mode, licence, iop, puts, e-commerce

Lift: buildings., countermeasure, perfecting, (2014), gray, jiangsu, supervision, trans, haier, (2013)

Score: construction, enterprise, system, trans, chinese, china, fuzzy, iop, algorithm, china's

Topic 6 Top Words:

Highest Prob: industry, rights, will, reserved., new, companies, many, challenges, international, one

FREX: book, property, japanese, intellectual, outsourcing, conference, biotechnology, examples, rights, reserved.

Lift: 1994, book,, elsewhere, industry-wide, 26th, 27th, x.0, invaluable, e-business,, handbook

Score: book, intellectual, japanese, companies, property, industry, rights, reserved., biotechnology, indian

Topic 7 Top Words:

Highest Prob: project, process, projects, implementation, management, approach, decision, model, tools, evaluation

FREX: project, projects, projects., risk, projects,, project., phase, tools, tool, decision

Lift: ppm, eco-innovation, gazprom, external,, (erp), eco-innovation., projects., integer, harmonization, checklists

Score: project, projects, projects., eco-innovation, software, process, risk, evaluation, decision, project.

Topic 8 Top Words:

Highest Prob: innovation, innovation., management, open, innovation,, paper, process, innovations, ltd., companies

FREX: innovation., innovation, open, radical, innovation,, innovations., incremental, inderscience, innovate, innovating

Lift: (ri), rri, imm, discontinuity, communicative, oi., innovation', innovation., champions, radical

Score: innovation, open, innovation., radical, innovation,, innovations, incremental, companies, ambidexterity, openness

Topic 9 Top Words:

Highest Prob: health, medical, healthcare, clinical, technology, management, care, equipment, engineering, maintenance

FREX: health, medical, healthcare, clinical, care, hospital, hospitals, patient, biomedical, patients

Lift: (htm)., biomed, chronic, clinical,, clinics, diseases., doctors,, hospitals, lippincott, nurse

Score: health, medical, clinical, healthcare, care, hospitals, hospital, patient, biomedical, patients

Topic 10 Top Words:

Highest Prob: power, brazilian, tourism, management, electric, sector, development, safety, nuclear, model

FREX: brazilian, tourism, nuclear, power, grid, brazil, regulation, electric, brazil., (ii)

Lift: (brazilian, las, aisti., artculo, grid., innovacin, nuclear, ocean, para, que

Score: power, tourism, brazilian, nuclear, electric, electricity, grid, wind, para, brazil

Topic 11 Top Words:

Highest Prob: information, service, services, communication, use, systems, security, ict, new, mobile

FREX: ict, service, information, logistics, security, electronic, rfid, services, banking, communication

Lift: multimodal, portal, rfid, ict, libraries, libraries., port, banks, portals, librarians

Score: service, information, cloud, services, logistics, mobile, security, ict, rfid, banking

Topic 12 Top Words:

Highest Prob: product, new, development, products, market, design, customer, marketing, companies, customers

FREX: product, npd, brand, products, customers, products., disruptive, front, marketing, (npd)

Lift: design-driven, npd., (npd), (pss), case-study, euro-australian, product's, lego, pss, npd,

Score: product, npd, products, customer, customers, brand, disruptive, market, design, (npd)

Topic 13 Top Words:

Highest Prob: research, management, literature, review, analysis, field, academic, management,, scientific, future

FREX: articles, papers, journals, journal, bibliometric, review, topic, text, research., topics

Lift: alberto, anniversary, articles., bibliometric, budapest,, citation-based, citespace, co-citation, counts, dirichlet

Score: journals, articles, papers, bibliometric, literature, citation, review, jpim, journal, academic

Topic 14 Top Words:

Highest Prob: firms, firm, performance, study, relationship, performance., capabilities, capability, management, effect

FREX: firm, firms, firms., performance., smes, firm's, firms,, capability, firms', capabilities

Lift: curvilinear, fuzzy-set, moderating, slack, (pls-sem), subsidiaries., taiwanese, returns., smes', moderates

Score: firms, firm, performance., smes, firms., firm's, capability, family, absorptive, moderating

Topic 15 Top Words:

Highest Prob: food, management, water, production, agricultural, rural, systems, use, productivity, group

FREX: food, agricultural, farmers, agriculture, soil, rural, water, yield, aquaculture, rice

Lift: css, dry, farmers, farms., necessity,, 11:, agricultural, breeding, cattle, civilian

Score: water, agricultural, food, farmers, soil, rural, agriculture, rice, coal, aquaculture

Topic 16 Top Words:

Highest Prob: research, paper, framework, study, purpose, practical, publishing, literature, model, case

FREX: originality/value:, design/methodology/approach:, emerald, limited., purpose:, findings:, implications:, purpose, publishing, practical

Lift: design/methodology/approach, originality/value, shortcomings,, design/methodology/approach:, limitations/implications, limitations/implications:, originality/value:, multi-attribute, intuition, implications:

Score: emerald, originality/value:, design/methodology/approach:, findings:, purpose:, limited., implications:, limitations/implications:, originality/value, literature

Topic 17 Top Words:

Highest Prob: study, results, data, factors, analysis, using, research, used, survey, patent

FREX: patent, patents, questionnaire, variables, collected, showed, survey, statistical, regression, correlation

Lift: average,, regression,, chi-square, gender,, intention., patent., tam, (tam),, spss, finding:

Score: patent, patents, questionnaire, data, variables, regression, survey, collected, factors, companies

Topic 18 Top Words:

Highest Prob: technology, technological, management, technologies, development, paper, strategic, technology., transfer, can

FREX: roadmapping, technology, technological, convergence, transfer, technology., roadmap, roadmaps, acquisition, technologies.

Lift: (stm), (trl), roadmap., roadmapping, stm, roadmapping,, roadmapping., trls, (trm), roadmaps

Score: technology, technological, roadmapping, technologies, transfer, strategic, roadmaps, roadmap, convergence, technologies.

Topic 19 Top Words:

Highest Prob: policy, r&d, public, countries, national, developing, paper, economic, government, global

FREX: countries, trading, countries., economies, policy, foreign, francis, policies, informa, limited,

Lift: fdi, finland,, fdi,, (fdi), trading, country-specific, industrialised, latecomer, informa, asian

Score: countries, policy, r&d, foreign, national, francis, fdi, government, taylor, chinese

Topic 20 Top Words:

Highest Prob: learning, engineering, education, university, students, management, design, program, teaching, educational

FREX: students, teaching, courses, students., education, faculty, student, course, curriculum, educational

Lift: e-learning, wiki, (pbl), 20+, bachelor, curricula,, curricular, didactic, elearning, faculty.

Score: students, education, teaching, learning, engineering, educational, courses, helicopter, curriculum, student

Topic 21 Top Words:

Highest Prob: sustainable, energy, environmental, sustainability, green, can, development, gas, renewable, oil

FREX: carbon, nanotechnology, green, renewable, sustainability, energy, emissions, environmental, co2, sustainable

Lift: carbon, chemicals, diesel, dioxide, emissions, emissions., fuel., fuels, gas,, gases

Score: energy, environmental, green, sustainable, renewable, sustainability, carbon, gas, fuel, co2

Topic 22 Top Words:

Highest Prob: research, organizational, knowledge, collaboration, ideas, creative, work, leadership, team, creativity

FREX: creativity, creative, leadership, entrepreneurial, employees, team, teams, employee, collective, collaboration

Lift: crowdfunding, individual-level, members', teamwork, incubator, creativity., styles,, bmi, twofold., employee-driven

Score: creativity, creative, organizational, team, entrepreneurship, entrepreneurial, leadership, collaboration, ideas, employees

Topic 23 Top Words:

Highest Prob: social, diffusion, media, may, can, uncertainty, potential, adoption, within, wiley

FREX: diffusion, john, media, wiley, social, uncertainty, sons, heart, attitudes, sons,

Lift: (cpb), aorta, cannulation, cpb,, female., mortality, myocardial, usa), atrial, cardiac

Score: social, media, diffusion, wiley, john, extracorporeal, cpb, sons, mortality, uncertainty

Topic 24 Top Words:

Highest Prob: network, networks, collaborative, management, system, ieee., can, based, systems, access

FREX: network, networks, networks., distributed, collaborative, networks,, virtual, 2003, adaptive, web

Lift: ethernet, gigabit, ietf, network-wide, qos, corba, mpls, networks., standardization., topology

Score: network, networks, collaborative, networks., wireless, virtual, web, architecture, distributed, mobile

Text

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Timeline

Description automatically generated with medium confidence

Better way to approximate each topic (Title, Abstract, Keywords)

Diagram

Description automatically generated

A picture containing timeline

Description automatically generated

Chart, scatter chart

Description automatically generated

Timeline

Description automatically generated

Text

Description automatically generated

Chart, scatter chart, bubble chart

Description automatically generated

Chart

Description automatically generated

Next steps:

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1. 13 September – topic annotation submission (time series chart)
2. 20 September – 1st complete manuscript submission

# Discussion

# Conclusion