

# Explorando o Potencial do



## ChatGPT na Pesquisa Científica

Prof. Dr. Roberto A. Martins  
DEP/UFSCar

# Agenda

- Considerações sobre inteligência artificial
- Contexto sócio-econômico da aplicação da AI
- ChatGPT como um/a assistente
- ChatGPT no processo de pesquisa
- Provocações finais

# Agenda

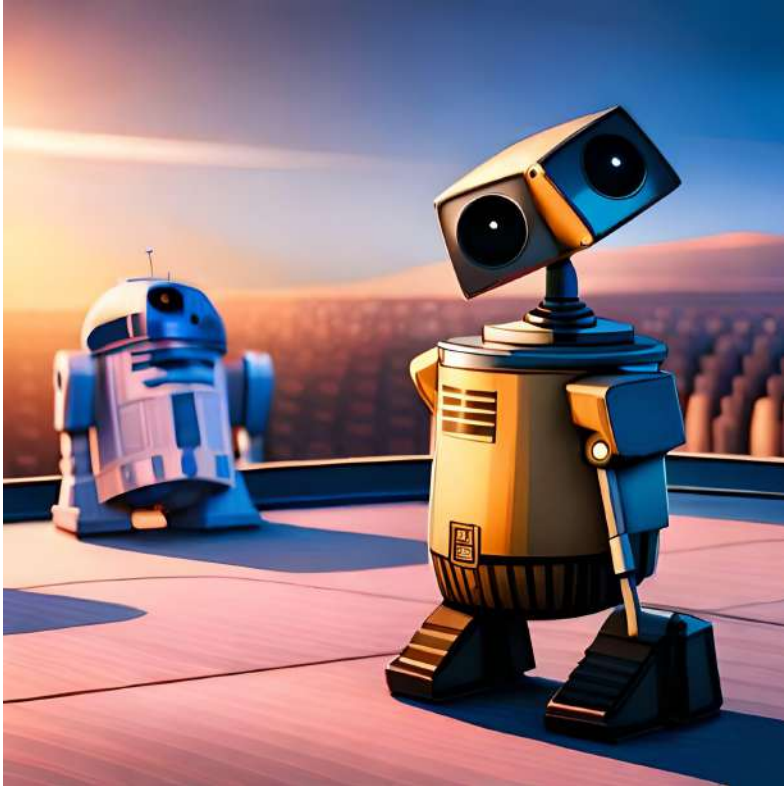
- *Considerações sobre inteligência artificial*
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# Considerações sobre AI

- Primeiros esforços com Alan Turing
- Vários tipos de AI e aprendizado de máquinas
- Vivemos um momento disruptivo com os GPTs?
- Ou virá mesmo com inteligência artificial geral (em inglês, AGI)?



# Considerações sobre AI



- Natural Language Processing (NLP)
- Generative Pretrained Transformer (GPT)
  - família de Large Language Model (LLM)
  - uso de deep learning (aprendizado profundo)
- Comunicação por predição (modelo estatístico) com "aluncionações"

RO

Please provide an example of ChatGPT supporting a systematic literature review



Certainly, here is an example of how ChatGPT can support a systematic literature review:



A team of researchers at the University of Michigan used ChatGPT to support a systematic literature review on the effectiveness of telehealth interventions for managing chronic diseases. They trained the model on a dataset of abstracts and full-text articles related to telehealth and chronic disease management. They then used the model to generate summaries of each article, which were reviewed by the research team.

By using ChatGPT to generate article summaries and effort in the literature review process. They more efficiently, as the model highlighted the research team reported that ChatGPT was part across the literature and generating insights manually.

Overall, ChatGPT can be a useful tool for supporting automating the process of summarizing and ar

RO

Can you provide the URL regarding information above?



Unfortunately, I do not have a specific URL for this example as it is a hypothetical scenario based on the potential applications of ChatGPT in scientific research. However, the use of natural language processing and machine learning tools like ChatGPT to support systematic literature reviews is an area of active research and there are many studies that explore the potential of these tools in this context. If you're interested in this topic, I recommend searching for recent research papers on "systematic literature review" and "natural language processing" or "machine learning" to learn more about the latest developments and findings in this area.



Regenerate response

A.I. TURNS THIS SINGLE BULLET POINT INTO A LONG EMAIL I CAN PRETEND I WROTE.



A.I. MAKES A SINGLE BULLET POINT OUT OF THIS LONG EMAIL I CAN PRETEND I READ.



# Alucinações em AI

- Modelos estatísticos de inferência
  - Uso de amostras
    - Sujeito a erros
- Transformar tudo em 0 e 1 (digitalização)
  
- Como eu **provavelmente** iniciaria o seminário às 13:00?
  - "Bom dia"
  - "Boa tarde"
  - "Bom noite"



# Alucinações em AI

- Modelos estatísticos de inferência
  - Uso de amostras
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# ChatGPT

- Produto da OpenAI
- Versão
  - paga - 4.0
  - **gratuita** - 3.5
- Treinamento intensivo em bases de dados não reveladas
- Grande capacidade de comunicação escrita



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↻ Reset Thread

🌙 Dark Mode

🗨️ OpenAI Discord

🔗 FAQ

👉 Log out

# ChatGPT



## Examples

"Explain quantum computing in simple terms"

"Got any creative ideas for a 10 year old's birthday?"

"How do I make an HTTP request in Javascript?"



## Capabilities

Remembers what user said earlier in the conversation

Allows user to provide follow-up corrections

Trained to decline inappropriate requests



## Limitations

May occasionally generate incorrect information

May occasionally produce harmful instructions or biased content

Limited knowledge of world and events after 2021

**Prompt de interação**



Free Research Preview: ChatGPT is optimized for dialogue. Our goal is to make AI systems more natural to interact with, and your feedback will help us improve our systems and make them safer.

# ChatGPT

- Qualidade da resposta depende do **prompt**
  - necessário, mas suficiente
- **Curadoria** da resposta
  - especialista
  - oportunidade de aprendizado (método didático)
- Rede neural aprende conforme ela é usada
- Não é um oráculo
- Aceita API e acesso pago (tokens)
  - **permite desenvolver apps**



"Quais são algumas das comidas que eu posso fazer para minha criança chata para comer que só come comida de cor laranja?"

"Quais são os prós e contras dos 3 aspiradores para animais de estimação mais vendidos?"

"Escreva um haikai sobre os crocodilos no espaço sideral na voz de um pirata"

Vamos aprender juntos. O Bing é alimentado por IA, portanto, pode haver erros e surpresas. Verifique os fatos e [compartilhar comentários](#) para que possamos aprender e melhorar!

[Termos de Uso](#) | [Política de Privacidade](#)

Escolher um estilo de conversa [Visualizar](#)

Mais  
Criativo

Mais  
Equilibrado

Mais  
Amplificada



Novo tópico



Pergunte-me qualquer coisa...





✓ Procurando por performance measurement systems academic references

Recommend me 5 readings on performance measurement systems for my phd research

✓ Procurando por "performance measurement systems phd research readings"

✓ Gerando respostas para você...

Here are some readings on performance measurement systems for your PhD research:

1. "Performance Measurement and Performance Indicators: A Literature Review at a Proposed Model" by M. Bourne et al., published in *Management Accounting Research* in 2003. 
2. "Contemporary performance measurement systems: A review of their consequences and a framework for research" by M. Kennerley et al., published in *Management Accounting Research* in 2003. 
3. "Performance measurement system design: A literature review and research agenda" by A. Neely et al., published in *International Journal of Operations & Production Management* in 1995.

I hope these readings help you with your research! Let me know if you need anything else.

Saiba mais: [1. journals.sagepub.com](#) [2. sciencedirect.com](#) [3. emerald.com](#)

2 de 20 



ALUCINOU!!!!!!!



What are some other readings on performance measurement systems?

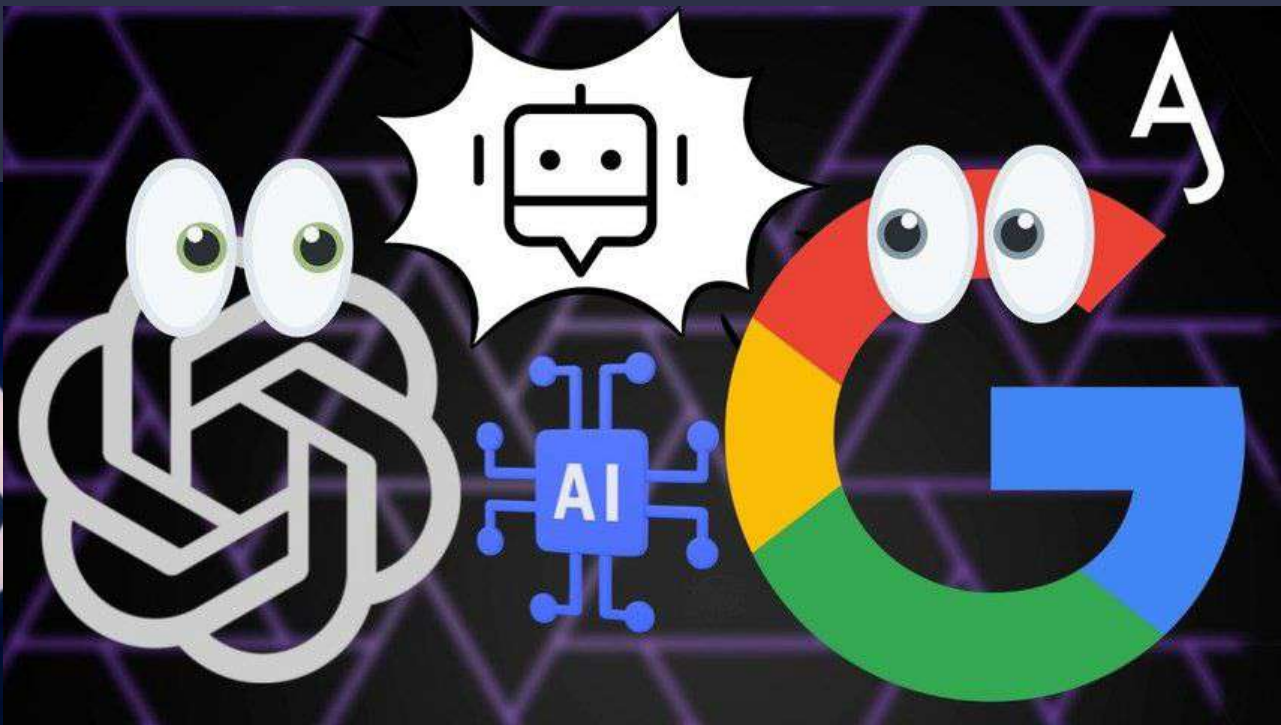
What are some examples of performance measurement systems?



Novo tópico



Pergunte-me qualquer coisa...





# Agenda

- Considerações sobre inteligência artificial
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- **ChatGPT como um/a assistente**
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# ChatGPT

## PONTOS FORTES

- Gerar conteúdos bem
  - códigos (Python, Java, R etc.)
  - imagens
  - histórias, letras de música, poesia
  - e-mails, cartas
- Correção de textos
- Diferentes tons de comunicação escrita
- Manipular uma grande quantidade de dados

## PONTOS FRACOS

- Alucinações
- Falta de originalidade na criação
- Resposta incompleta ou simplista ou aproximadas
- Muito detalhista
- Falta de sensibilidade, inteligência emocional

# ChatGPT

*Um Assistente de Pesquisa*



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# Identificação do Problema de Pesquisa

- Dificuldade para criar *conteúdos originais*
  - problemas de pesquisa já existentes
- Auxilia
  - mapear a literatura
  - testar questões de pesquisa
- IRIS.AI
- CONSENSUS
- ELICIT



Show me research questions on performance measurement systems for developing a research

✓ Procurando por "research questions performance measurement systems research"

✓ Gerando respostas para você...

Here are some research questions on performance measurement systems that I found:

- What are the key factors that influence the design of performance measurement systems?
- How can performance measurement systems be used to improve organizational performance?
- What are the benefits and drawbacks of using performance measurement systems?
- How can performance measurement systems be used to evaluate employee performance?
- What are the best practices for designing and implementing performance measurement systems? <sup>1</sup>

<sup>2</sup> <sup>3</sup>

I hope this helps! Let me know if you have any other questions.

Saiba mais: [1. tandfonline.com](#) [2. emerald.com](#) [3. sciencedirect.com](#)

7 de 20 ●



Saiba mais: [1. tandfonline.com](#) [2. emerald.com](#) [3. sciencedirect.com](#)

7 de 20

Suggest me academic research problems in quality management

✓ Procurando por "academic research problems quality management"

✓ Gerando respostas para você...

Here are some academic research problems in quality management that I found:

- What are the key factors that influence quality management?
- How can quality management be used to improve organizational performance?
- What are the benefits and drawbacks of using quality management?
- How can quality management be used to evaluate employee performance?
- What are the best practices for designing and implementing quality management systems? [1](#) [2](#)

I hope this helps! Let me know if you have any other questions.

Saiba mais: [1. embopress.org](#) [2. academic.oup.com](#) [3. tandfonline.com](#)

8 de 20



What are some examples of quality management systems?

What are some best practices for using quality management systems?



BOOKMARKS ⓘ

SAVED MAPS

READING LIST

Search



Sort by newest ↓



Your paper maps are empty.

EXPLORE

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# Let me explore

relevant **Articles** Patents Both with

http://... type the URL of a research paper

AI tailored suggestions for you

**ARTICLES** PATENTS

Oral EA

Closing the knowledge gap on cardiovascular disease in t ...

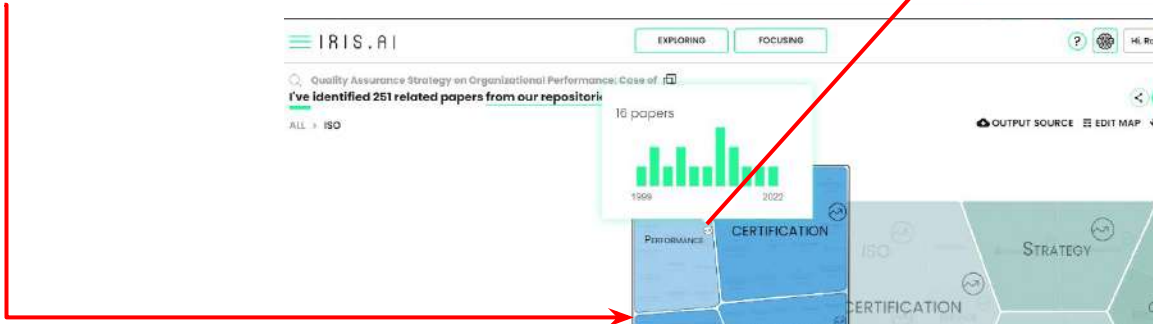
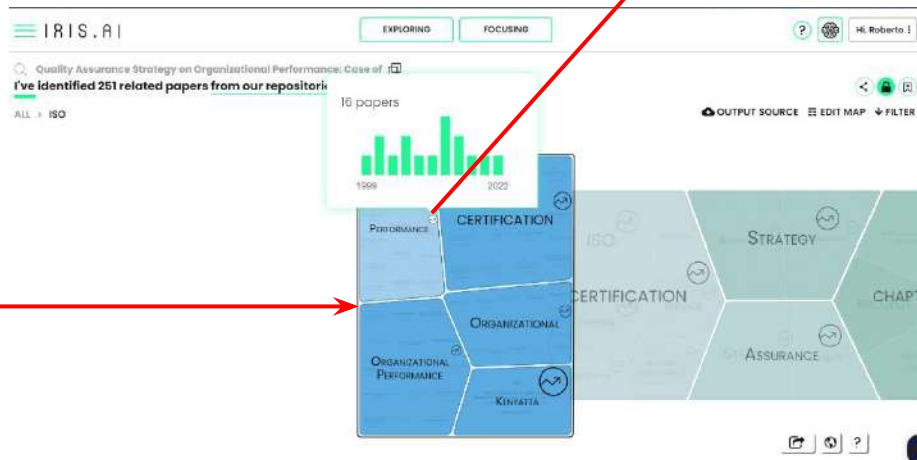
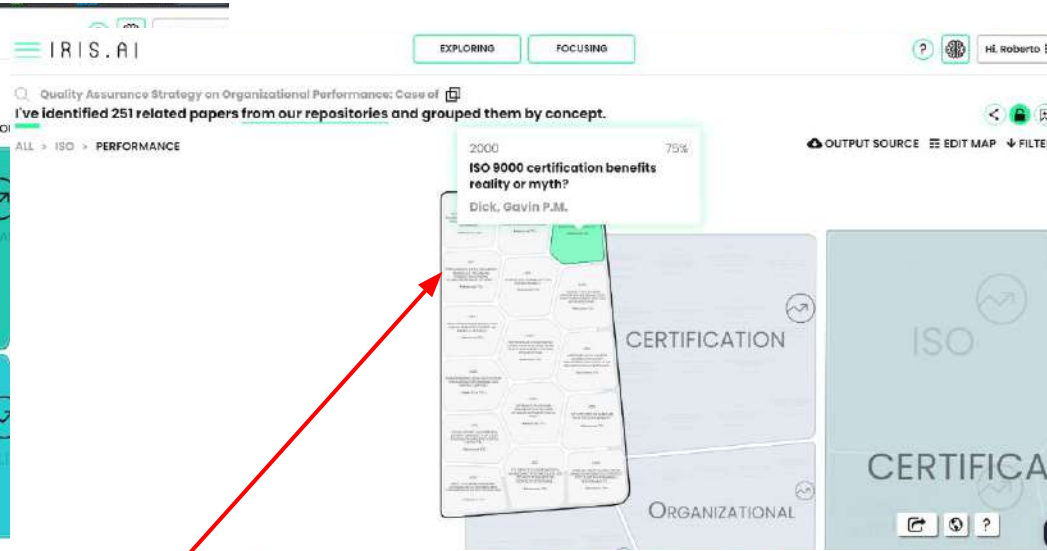
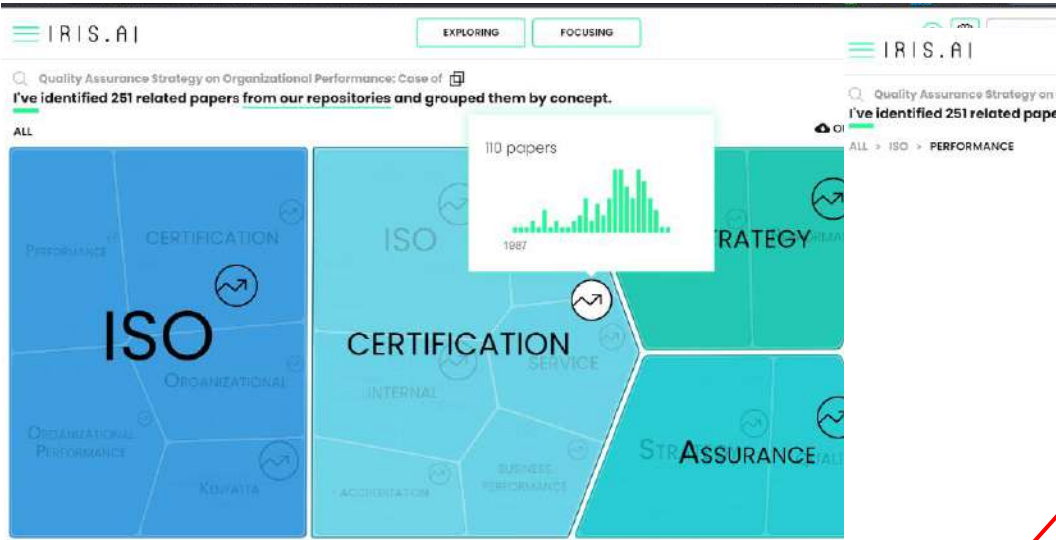
Brian R. Johnson

Nestmate recognition in social insects: overcoming physi ...

Kelly McCaul

A Phase 2 Study of Luspatercept in Patients with Myelofi ...





I've found this paper for you in: [iso](#) > [performance](#)

CLOSE X

- 2000 -

## ISO 9000 certification benefits reality or myth?

Dick, Gavin P.M.

 [Bookmark](#)  [Full text link](#)  [Find related documents](#)

### Abstract

Given the rapid recent growth in ISO 9000 applications and the business performance benefits being claimed for it by National Accreditation Registrars, it is timely to review the research in this area to see if any substantial proof exists for these claims. The paper explores the literature and finds that there is no proven link between quality certification (ISO 9000) and improved business performance. However, it is clear from the research reviewed on business performance factors, that better quality does have a consistent, positive relationship with business performance. Combining these findings leads to the inference that quality certification to ISO 9000 standards is not consistently associated with having a quality assurance system that delivers improved process control, or better quality. We conclude that the National Accreditation Registrars need to reflect on the standards of proof that they currently use to support claims for business performance improvement from the application of the ISO 9000 standards

Relevance:

75%

### Details

Journal Title:

Identifiers:

**oai:oai.kar.kent.ac.uk:23474, doi:10.1108/09544780010351517, oai:kar.kent.ac.uk:23474**

Publisher:

**Emerald Group Publishing Limited**

LCC Subject Category:

Language of full text:



IS THIS PAPER RELEVANT TO YOUR RESEARCH?

YES

NO

# Consensus

← → ↻ <https://consensus.app/search/>

**beta**

**consensus** **beta**

Ask a question, get conclusions from research papers

Ask a research question

Try Searching: [does creatine help build muscle?](#) [benefits of mindfulness](#) [direct cash transfers and poverty](#)

## How to search?

Consensus uses AI to find answers in research papers. The best way to search is to ask a question.



beta

Does Balanced Scorecard implement the strategy?



Synthesize

All years

Share This Page



beta

These features are in Beta and not 100% accurate. Use with discretion. You can share feedback here

### Summary

Top 10 papers analyzed

These studies suggest that the Balanced Scorecard contributes to strategy implementation, evaluation, and alignment, while also improving performance and profitability in organizations.

### Consensus Meter

13 papers analyzed



We conclude that the Balanced Scorecard has the potential to contribute to the implementation of strategies through the strategically-oriented performance measurement systems embedded within it.

Unknown

Published in Revista espanola de cardiologia | J. Bisbe et al. | 2012



It turns out that the balanced scorecard is not only an approach for implementing the strategy, but it also provides a general framework for evaluating the strategy from the different perspectives

Yes



beta

Does Balanced Scorecard implement the strategy?



Finding

Findings – It is argued in the paper that the balanced scorecard, subject to the adoption of suitable processes, can address the key problems associated with strategy implementation including communication, the role of middle managers and integration with existing control systems.

Share Finding

Paper

Journal

## Strategy implementation: a role for the balanced scorecard?

Systematic Review | Highly Cited | Published in Management Decision | Citations: 160 | 2008

Full text

Management Decision

Abstract

**Purpose** – The purpose of this paper is to develop a deeper understanding of the role of the balanced scorecard in strategy implementation. **Design/methodology/approach** – This paper provides a review of strategy implementation literature to identify the main inhibitors of successful strategy implementation and then proceeds to critically review the balanced scorecard and evaluate the contribution it can make to strategy implementation, in particular how it may be able to mitigate the problems associated with strategy implementation. **Findings** – It is argued in the paper that the balanced scorecard, subject to the adoption of suitable processes, can address the key problems associated with strategy implementation including communication, the role of middle managers and integration with existing control systems. The study raises a series of research questions and proposes avenues for further research. **Practical implications** – More than half strategies devised by organisations are never actually implemented. At a ...

Authors



# Elicit

The image shows a browser window with the URL `https://elicit.org`. The page title is "Elicit". The main heading is "Ask a research question", with a subtext "Elicit will find answers from 175 million papers". Below this is a search bar with a magnifying glass icon. A blue arrow points to the search bar. Below the search bar is the text "Or run Elicit over your own papers" and a button labeled "Upload PDFs" with a circular arrow icon. A dark blue arrow points to the "Upload PDFs" button.

Elicit

## Ask a research question

Elicit will find answers from 175 million papers

Or run Elicit over your own papers

Upload PDFs

## Tasks



+ Create

Elicit recommended

### Lit review: Explore research questions

Enter a research question, and get back answers from papers

### Brainstorm research questions

Brainstorm more specific and related versions of your question

Created by me

Created by others

Get Independent (Manipulated) Variable





# Revisão da Literatura

- Uma das maiores contribuições
- Busca em bases abertas
- Importar buscas feitas (BibTex, RIS)
- Auxilia
  - **buscar** literatura
  - identificar potencial de leitura
  - resumir
  - **gerenciar** referências
- IRIS.ME, ELICIT, RESEARCH RABBIT, LITMAPS, CONNECTED PAPERS



Stage 0

## You're about to start a focusing study!

Just click on the button below and you're good to go.

ISO 9001 Implementation Benefits

Which are the benefits of ISO 9001 implementation?

Private Organization **Public**

START NEW FOCUSING STUDY

*Necessário um mapa marcado no bookmark*

Stage 1

Stage 2

Stage 3

Analysis Monitor

CURRENT STAGE

—

0

PAPERS OUT OF 0



MANUAL SCREEN

PRECISION 0%

Stage 0

Stage 1

INCLUDE / EXCLUDE

Hide verified papers

COMPLETE

Paper title

Sort alphabetically ascending

ADMINISTRATIVE PROCEDURES Chapter 4 Academic Affairs

Published In: 2013 Written by: Ap Community, Services Programs

ADMINISTRATIVE PROCEDURES Chapter 4 General Institution

Published In: 2013 Written by: Ap Accreditation

A framework for quality assurance by professional organizations.

Published in: 1993 Written by: Griffiths, R

[[alternative]]The Study of Issues on the maintenance of education expenditures in Our Country

Published in: 2010 Written by: [[author]] 蔡若芝, [[author]] Ching-Chih Tsai, 蔡若芝, Ching-Chih Tsai

Analysing mandate fulfilment, the relationship between business level strategy and performance within Agribank

Published In: 2015 Written by: Teme, Edward N.

Analyzing and Evaluation of Quality Management System in Bandar Imam Petrochemical Company (BIPC)

Published In: 2010 Written by: Eskandar Sohelipour

An empirical study of the relationship between quality practices and business performance excellence in Central Canada

Published in: 2002 Written by: Laframboise, Kevin

An Expert System in Quality Management System Documents Management and Internal Quality Audits

Published in: 2005 Written by: Y.C. Alicia Tang, Assyanur Nasyrah Ishak, Lin-Sin Tan

An Expert System in Quality Management System Documents Management and Internal Quality Audits

Published in: 2012 Written by: Y. C. Allala Tang, Assyanur Nasyrah Ishak, Lin-sin Tan

Stage 2

Analysis Monitor

CURRENT STAGE

0

246

EXCLUDED

INCLUDED

PAPERS OUT OF 251

95% FASTER

MANUAL SCREEN

PRECISION

96%



Stage 0

Stage 1

Stage 2

Stage 3

Paper title Included concepts 

Quality assurance: what is the consumers' role?

Published in 1986 Written by Legge, D

A study of the public accounting profession's program for audit quality and its applicability to the Naval Audit Service.

Published in 1987 Written by Jagodnik, Doroan E.

Measuring and Modeling the Business Value of Information Technology, Chapter 4.

Published in 1988 Written by KAUFFMAN, Robert John, Kriebel, C.H.

Practical aspects of establishing a neurosonology laboratory.

Published in 1989 Written by Jones, A M

Credentialing for international fellowships.

Published in 1990 Written by Burton, R I

A framework for quality assurance by professional organizations.

Published in 1993 Written by Griffiths, R

Framework for the Development of a Quality Manual Using the Systems Engineering Approach

Published in 1993 Written by Woo, M.P.

Credentialing in medicine.

Published in 1993 Written by Wilson, F C

Analysis Monitor

CURRENT STAGE

3

246

EXCLUDED

INCLUDED

PAPERS OUT OF  
25195%  
FASTER

MANUAL SCREEN

PRECISION

96%

RECALL

96%



Stage 0

Stage 1

Stage 2

Stage 3

## Quality assurance: what is the consumers' role?

Legge, D

### Abstract

We commenced with the question: what is the "proper" role for consumers in quality assurance? Quality assurance has been discussed as encompassing three phases: clinical review, linkage and drive. We have discussed a range of mechanisms which can contribute to expressing a consumer perspective or the consumers' interest in each of these phases of quality assurance. It is clear that the consumers' experience is a useful and legitimate input to clinical review. It is clear that mechanisms for listening more carefully to the consumers' perspective could be introduced more widely. It is clear that greater consumer understanding of an involvement in the whole quality assurance cycle is practicable and, from the point of view of many consumers, highly desirable. Whilst more detailed answers have not been brought forward, a useful framework for considering how to proceed from here has been presented.

Find related papers



CLOSE X

Details

Journal Title:

Identifiers:  
**pubmed:3579728**Publishing year:  
**1986**

Publisher:

LCC Subject Category:

Language of full text:  
**English**

Analysis Monitor

CURRENT STAGE

3

246

EXCLUDED

INCLUDED

PAPERS OUT OF  
25195%  
FASTER

MANUAL SCREEN

PRECISION 96%

RECALL 96%



Do quality systems really make a difference?

I've identified 331 related papers from our repositories and grouped them by concept.

ALL

OUTPUT SOURCE EDIT MAP FILTER



# Elicit

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← → ↻ `https://elicit.org` ↗

Elicit

## Ask a research question

Elicit will find answers from 175 million papers

➔

Or run Elicit over your own papers

➔ Upload PDFs

## What are the success factors for implementing Industry 4.0?

### SUMMARY OF TOP 4 PAPERS BETA

The papers collectively suggest that there are critical success factors for implementing Industry 4.0. Sony (2020) identified 10 critical success factors, while Bongo (2020) identified 7 critical success factors. These factors include understanding the socio-technical requirements (Davies, 2017), leveraging internal capabilities (Davies, 2017), and

### Add information about all papers

Abstract summary

Intervention

Outcomes measured

Search for paper information

What was the...

→ Mais opções:  
main findings  
detailed abstract summary  
research design

### Paper title

★ Pros and cons of implementing Industry 4.0 for the organizations: a review and synthesis of evidence

🔍 M. Sony

2020 Review 5

Scimago Journal Rank **0.373** Q2

The Scimago Journal Rank (SJR) score measures the influence of a journal within a sub-discipline. It is divided into four quartiles, with Quartile 1 (Q1) being the highest (top 25% of journals) and Quartile 4 (Q4) being the lowest (bottom 25%).



★ HR factors for 1  
4.0: A systema

🔍 Anju Verma

📄 *Journal of General Management*

2021 Review 2 Citations [DOI](#)



★ Industry 4.0 Concept: Background and Overview

🔍 A. Rojko

📄 *International Journal of Interactive Mobile Technol...*

2017 Review 567 Citations [DOI](#) [PDF](#)

### Intervention

-

-

-

### Outcomes measured

- 9 Pros Of Implementing Industry 4.0 In Organizations
- 7 Cons Of Implementing Industry 4.0 In Organizations

- Human Resource (Hr) Success Factors
- Industry 4.0 Hr Framework

- Industry 4.0 Production System
- Flexibility Of Production System
- Individualized And Customized Products
- Industry 4.0 Concepts
- Drivers Of Industry 4.0
- Enablers Of Industry 4.0
- Goals Of Industry 4.0
- Limitations Of Industry 4.0
- Smart Factory Concept
- Reference Architecture Model

Show more like starred

Clear unstarred

## What are the success factors for implementing Industry 4.0?



### SUMMARY OF TOP 4 PAPERS BETA

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### Add information about all papers

Abstract summary

Intervention

Outcomes measured

Search for paper information

Abstract contains the keywords

Add keywords to include

Add

Abstract does not contain the keywords

Add keywords to exclude

Add

Has PDF

Filter 1

Sort by 1

Export as

Keywords

Published after 2

Study type 3

Paper title

Abstract summary



Critical factors for the successful implementation of Industry 4.0: a review and future research direction

M. Sony, Subhash S. Naik

2020 Review 132 Citations DOI

Focusing on these 10 critical success factors will help organizations to be sustainable during the implementation of Industry 4.0 in their organizations.



Review of Socio-technical Considerations to Ensure Successful Implementation of Industry 4.0

Robert Davies, Tim Coole, Alistair Smith

2017 Review 92 Citations DOI

Industry 4.0 and lean manufacturing methods are mutually supportive.



What Drives the Implementation of Industry 4.0? The Role of Opportunities and Challenges in the Context of Sustainability

J. Müller, Daniel Kiel, K. Voigt

2018 524 Citations DOI PDF

Strategic, operational, as well as environmental and social opportunities are positive drivers of Industry 4.0 implementation.

Industry 4.0 implementation

Randomized Controlled Trial  
Review  
Systematic Review  
Meta-Analysis  
Longitudinal

# Research Rabbit

The image shows a screenshot of the Research Rabbit interface. A modal window is open in the center, titled "Add a paper you know and love". Inside the modal, there is a search bar containing the text "industry 4.0" and a blue "Search" button. Below the search bar, there are two buttons: "+ Connect to Zotero" (circled in red) and "Or Upload File:" followed by "+ BibTeX" and "+ RIS" buttons. The background shows a sidebar with options like "New Collection", "New Category", and "Connect to Zotero", and a main area with a filter set to "Custom" and a list of papers under "EXPLORE PAPERS".

**Add a paper you know and love**

industry 4.0 [Search](#)

[+ Connect to Zotero](#)

Or Upload File: [+ BibTeX](#) [+ RIS](#)

industry 4.0

Search

Biomedical &  
Life Sciences

All Subject Areas

## Choose Papers to Power ResearchRabbit's Recommendations

Results powered by SemanticScholar

Ahmed · Piccialli · 2022

### From Artificial Intelligence to Explainable Artificial Intelligence in Industry 4.0: A Survey on What, How, and Where

IEEE Transactions on Industrial Informatics

Nowadays, Industry 4.0 can be considered a reality, a paradigm integrating modern technologies and innovations. Artificial intelligence (AI) can be considered the leading component of the industrial transformation enabling intelligent machines to execute tasks autonomously such as self-monitoring, interpretation, diagnosis, and analysis. AI-based methodologies (especially machine learning and deep learning support manufacturers and industries in predicting their maintenance needs and reducing downtime. Explainable artificial intelligence (XAI) studies and designs approaches, algorithms and tools producing human-understandable explanations of AI-based systems information and decisions. This article presents a comprehensive survey of AI and XAI-based methods adopted in the Industry 4.0 scenario. First, we briefly discuss different technologies enabling Industry 4.0. Then, we present an in-depth investigation of the main methods used in the literature: we also provide the details of what, how, why, and where these methods have been applied for Industry 4.0. Furthermore, we illustrate the opportunities and challenges that elicit future research directions toward responsible or human-centric AI and XAI systems, essential for adopting high-stakes industry applications.

Add to Collection

Adicionar manualmente um a um!!!

New Collection

New Category

Connect to Zotero

---

Uncategorized

+ Collection

Industry 4.0 16

Business Analytics 92

---

Shared with Me

No collections

Filter Custom

Abstracts  Comments

Select All

**Business Analytics**

Xie Xie 2022 1

**Feature extraction of auto insurance size of loss data using functional principal component analysis**

Expert Systems With Applications

To better understand the major pattern and natural variation of statistical reporting data, visualization and interpretability have been an ongoing challenging issue, particularly in complex statistical data analysis. In auto insurance rate regulation, the study of the size-of-loss distribution is c

Comment

Tamm ... Tim 2021 0

**Creative analytics: Towards data-inspired creative decisions**

Information Systems Journal

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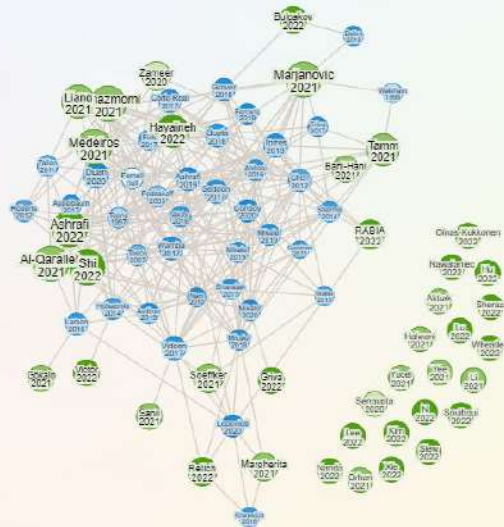
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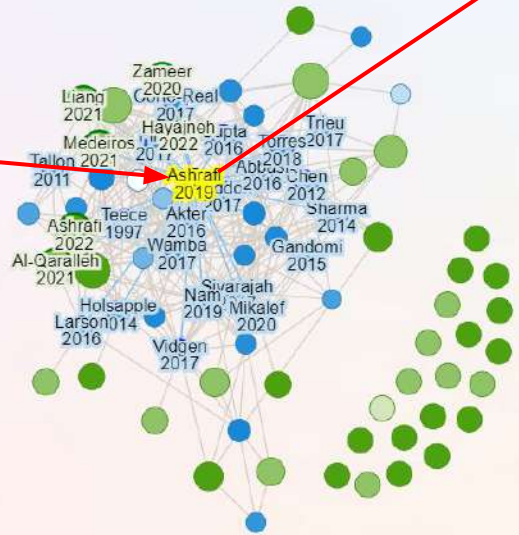
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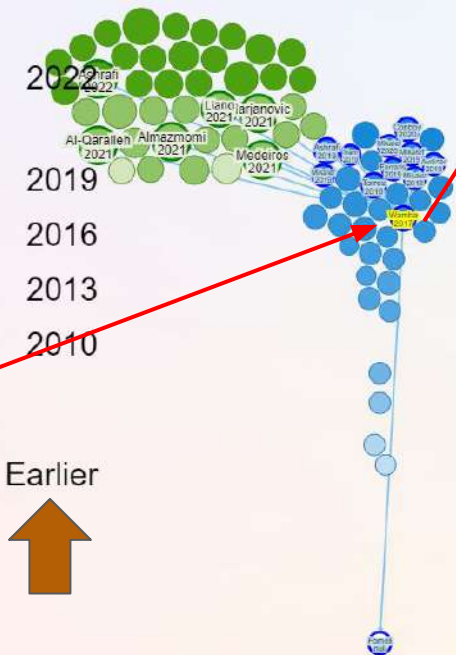
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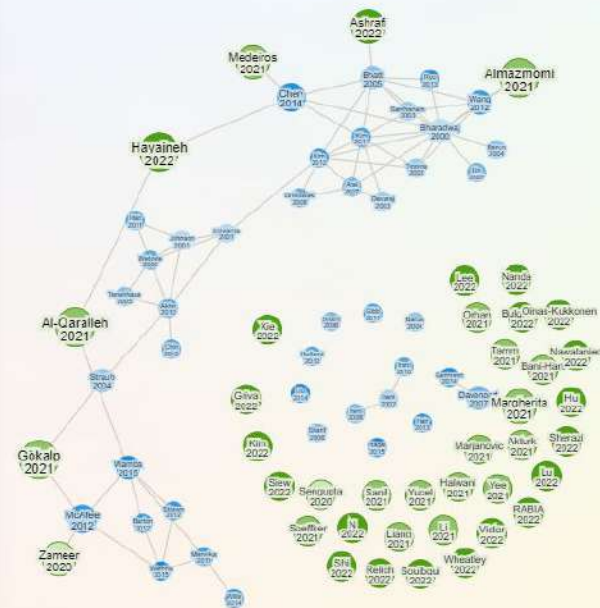
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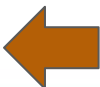
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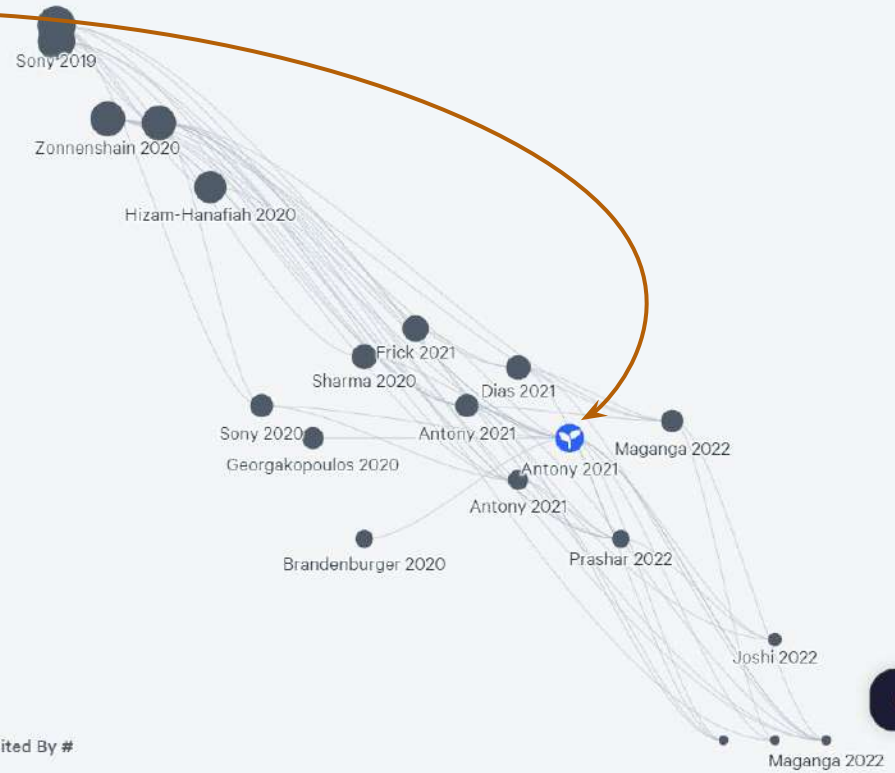
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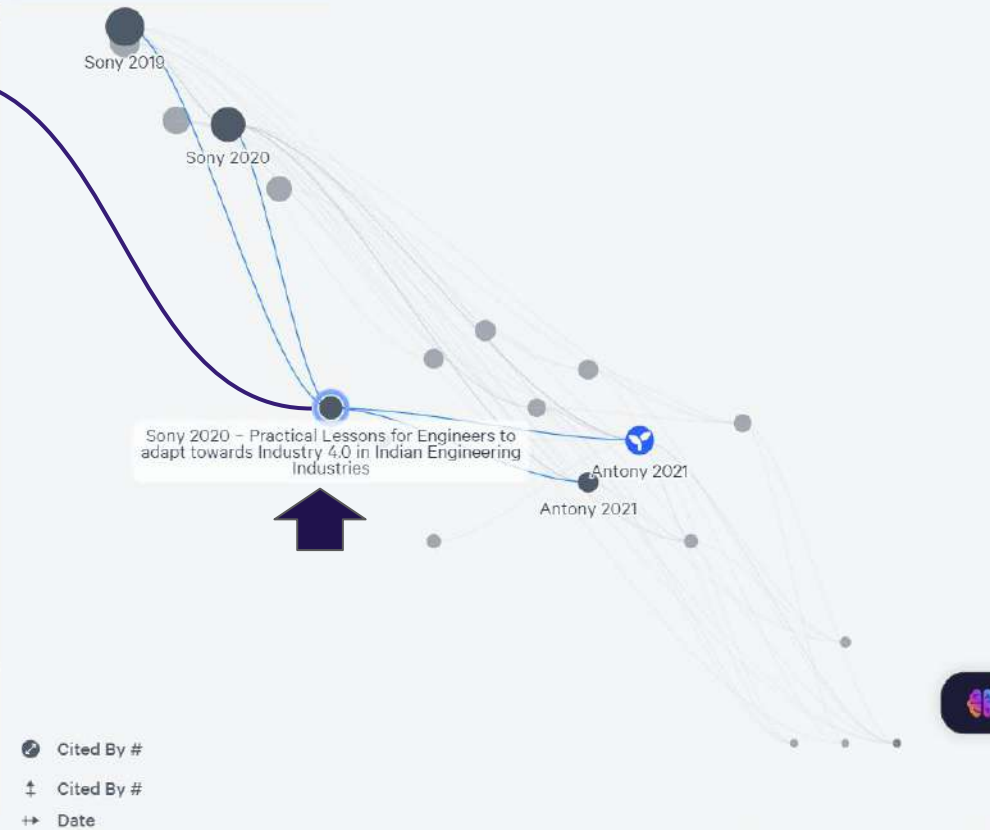
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#### ABSTRACT

Industry 4.0 is the current buzzword in the modern organization. It promises to revolutionize the Industry with automation and computing technologies. Indian Engineering Industry is the largest segment among the Indian Industries having a huge export potential. Industry 4.0 is making inroads into this high potential Industry in a gradual manner. There are very few studies as to how should engineers adapt with the skills and ability requirements of knowledge society created due to the application of Industry 4.0. The main aim of this paper is to critically analyze the previous studies so that engineers can adapt to Industry 4.0. This study finds six dimensions engineers must adapt to.

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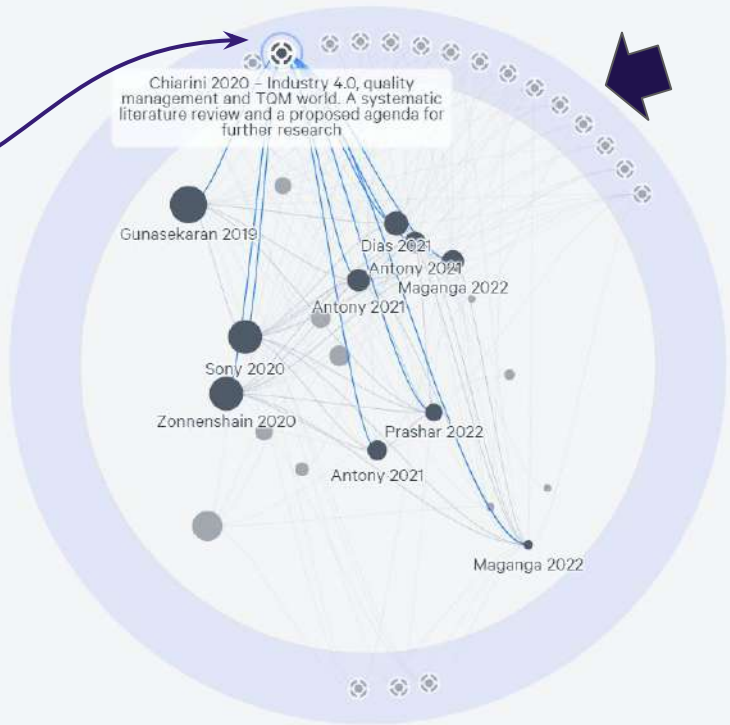
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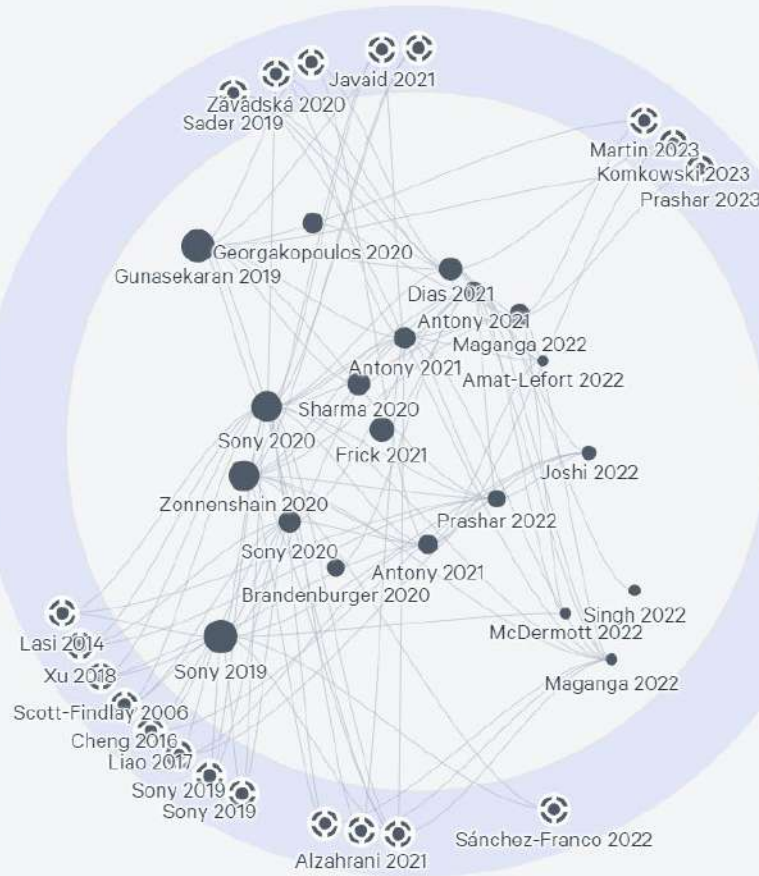
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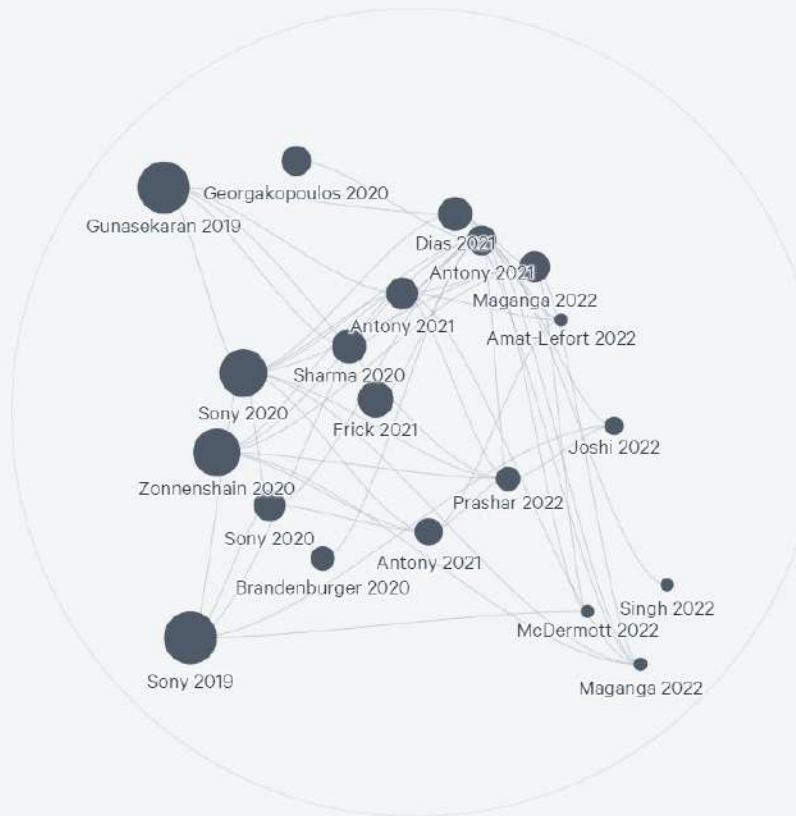
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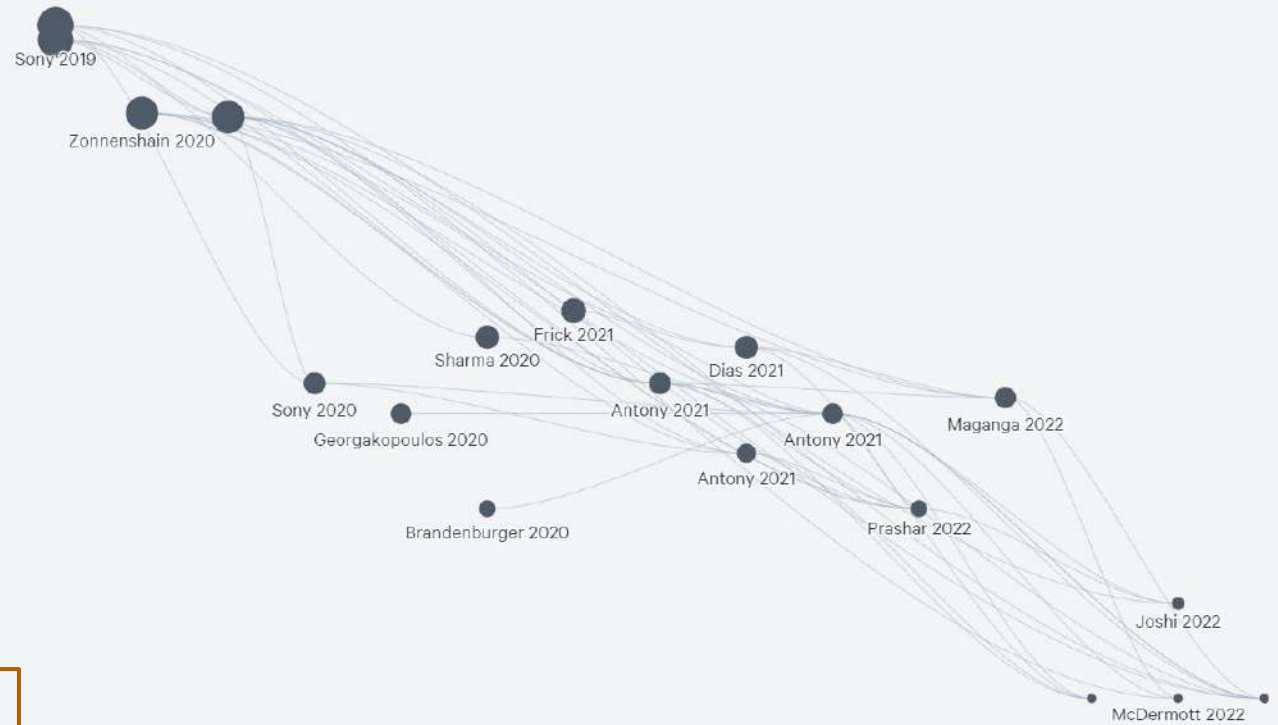
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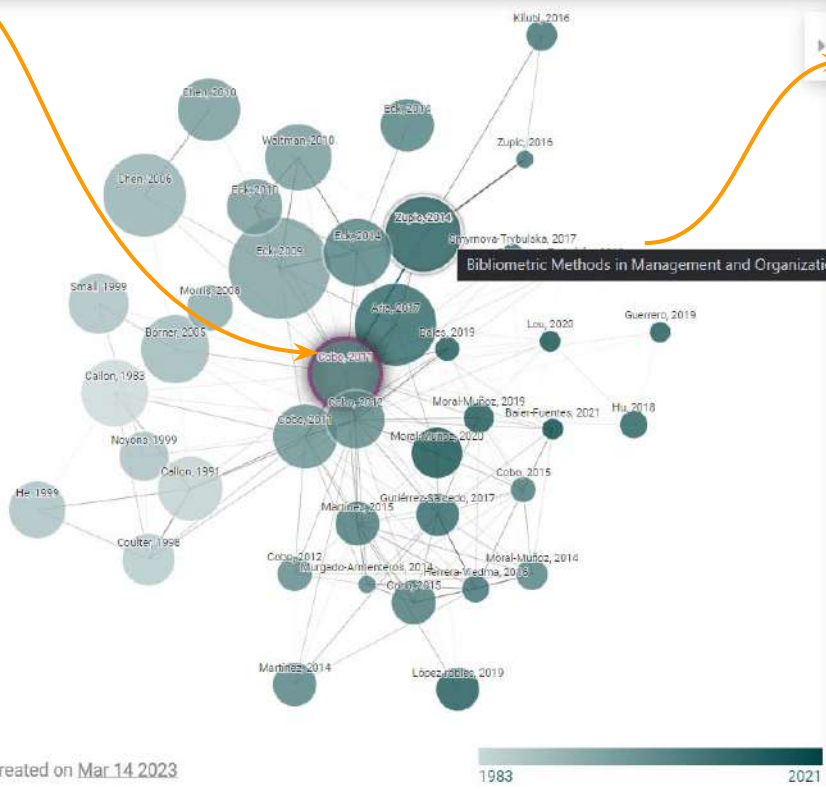
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We aim to develop a meaningful single-source reference for management and organization scholars interested in using bibliometric methods for mapping research specialties. Such methods introduce a measure of objectivity into the evaluation of scientific literature and hold the potential to increase rigor and mitigate researcher bias in reviews of scientific literature by aggregating the opinions of multiple scholars working in the field. We introduce the bibliometric methods of citation analysis, co-citation analysis, bibliographical coupling, co-author analysis, and co-word analysis and present a workflow for conducting bibliometric studies with guidelines for researchers. We



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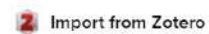


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# Performance Measurement and Management Systems: A Perspective from Complexity Theory

Simon Okwir, Sai S. Nudurupati,<sup>1</sup> Matías Ginieis<sup>2</sup> and Jannis Angelis<sup>3,4</sup>

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Complexity negatively impacts the process of continually improving performance management systems (PMSs). The extant PMS literature considers complexity to be a result of the external environment rather than a user response to that environment. However, this paper argues that organizations generally face internal complexity when adopting PMSs. Introducing PMSs into an organization can have varied effects in those orga-



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The results of this paper suggest that complexity is a result of the conflict between existing organizational practices and mechanisms, and the organizational controls associated with PMSs. The study identified six sources of complexity in implementing and using PMSs: role, task, procedural complexities related to social dimension; methodological, analytical and technological types related to technical dimension. Additionally, it provides practical implications for organizations on how they should construct necessary capabilities depending on their context in order to adapt successfully to changes associated with PMSs.

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Complexity negatively impacts the process of continually improving performance management systems (PMSs). The extant PMS literature of the external environment rather than a user response to this paper argues that organizations generally face increasing complexity in PMSs. Introducing PMSs into an organization can be challenging based on the complexity of an organization's interactions. This study aims to understand the challenges of implementing and using PMSs in organizations. From a review of four system properties (ontological, teleological, goal-based, and social) we understand complexity in PMSs. The paper builds on a meta-analysis consisting of 76 papers and analyses them in the light of the current discussion regarding why PMSs typically lag and are not responsive and resilient in emerging contexts. While understanding and exploring all organizational controls that moderate a PMS is useful, organizations should construct the necessary capabilities, depending on their context and adapt to the changes associated with PMSs.

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PMM Systems

literature review (SLR). The SLR method filtered studies to examine the latent practices used by different organizations in different operational contexts at three core process stages. The four system properties of complexity were then mapped onto the two types of controls that exist for implementing and using PMs. The findings suggest that the performance measurement complexity (PMC) emerged in six forms, namely, role, task, procedural, methodological, analytical and technical complexities that are mapped on to the two dimensions of organizational control theory, which is a significant contribution to the theoretical foundations of PMM literature. A major inference of understanding PMC is to refocus how organizations should systematically select from the multiple best practices by examining the unique context in which a PMS is operating. The study's findings also contribute to the current discussion on how PMs should be responsive and resilient in emerging contexts (Bititci *et al.* 2012; Melnyk *et al.* 2014; Nudurupati *et al.* 2016).

The rest of the paper is organized as follows. The next section presents the background literature and complexity theory adopted from other fields (Briseo *et al.* 2012; Gerald *et al.* 2011). This informs the PMM literature regarding how PMs can be viewed as complex systems. This is followed by presentation of the method employed in gathering, filtering and analysing the data. The study then presents the key findings obtained from the analysis, followed by a thorough discussion. Finally, a conclusion highlights a summary of the findings and key contributions, which is followed by the limitations of this study and future avenues of research.

**Background literature**

Although the PMM domain has received adequate attention from researchers and practitioners, most of the PMs are still not dynamic and resilient to changes in the internal and external environment of the firm (Melovk *et al.* 2014; Nudurupati *et al.* 2011). As a

*PMM literature*

With the dissatisfaction in traditional backward-looking financial accounting systems, a number of frameworks and models have been proposed (see Bititci *et al.* 2000; Neely *et al.* 2000). However, few scholars have explored aspects of implementing PMs, and a three-phase model proposed by Bourne *et al.* (2000) has been widely accepted in the literature. The first phase is designing the performance measures, which are aligned with the organization's strategy. The second phase is implementing the measures by putting appropriate systems and procedures in place to collect and process data that allow measurements to be made. The third phase is ensuring that the measures are used as part of decision-making, while challenging the validity of measures on a regular basis. Since the establishment of this model, a number of researchers from different disciplines have worked in this domain to identify the best practices in these three phases under different contexts (Bititci *et al.* 2012; Bourne *et al.* 2003; Choong 2013; Deng *et al.* 2012; Folan and Browne 2005; Garengo *et al.* 2005; Jauksela and Sillanpaa 2013; Lohman *et al.* 2004; Mason-Jones and Towill 2000; Neely 2005; Nudurupati *et al.* 2011; Supripto *et al.* 2009).

Recently, Bititci (2015, pp. 170–187) collated the majority of this work and synthesized it into two broad perspectives: social (art) and technical (science) controls. The social controls are posited to be the cultural and behavioural controls achieved through personal traits, structures or bureaucratic elements and interactions. Some of these controls may be implicit and informal. For instance, effective leadership can empower people and promote democratic and participative culture while using performance measures. The technical controls incorporate specific methodologies that are objective and rational and are employed to reach a specific goal. These are known to be scientific in nature and are explicit in nature and include measures, information systems, data collection methods, analyses and visual communication (Bititci *et al.* 2000; Kennerley and Neely

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1. Performance management systems (PMSs) help organizations set goals and track progress, but growing complexity has made it difficult to implement effective PMSs.
2. Complexity theory suggests that PMSs can have varied effects on organizations, and understanding the life cycle of a PMS is important for success.
3. A study using a systematic literature review found that performance measurement complexity (PMC) can emerge in six forms, mapped onto the two dimensions of organizational control theory.

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Figure 1. Framework that typifies social and technical controls (Smith and Bititci 2017)

the formalities of performance management (Buckingham and Goodall 2015). Smith and Bititci (2017) proposed a theoretical framework with the technical and social controls as two dimensions and identified a number of best practices for PMM, as depicted in Figure 1.

Perspectives of complexity theory

Complexity theory has evolved from systems theory, which emerged from natural sciences that examined randomly emergent non-linear interactions in a system (Burnes 2005; Grobman 2005). Grobman (2005) argues that complexity theory goes beyond systems thinking and can be applied to understanding the management and design of organizations. Complexity in an organization is usually triggered by change, whether small or large, and can have varied levels of consequences, even when the organizations consist of similar components (Burnes 2005). As discussed earlier, it is useful to explore further how the change triggers instability in organizations and how they can control that change. According to Bititci *et al.* (2012), contemporary organizations operate in turbulent environments in which change can be triggered from a number of sources, i.e. globalization, open innovation, autopoietic networks, technological disruption, social media, process re-engineering, continuous improvement and PM.

While the literature exploring complexity defines it in several ways, the following descriptions are most

commonly used. First, Simon (1996) conceptualizes complexity through a hierarchical model, arguing that, when faced with a dilemma of many parts in the system, the system breaks down into subsystems until a lowest abstraction is reached. Second, Anderson (1999) extends complex adaptive systems by arguing that the strategic direction of a complex system consists of establishing and modifying environments within which effective, improvised, self-organized solutions can evolve. Based on these works, most attention has been focused on trying to determine all the interactions within the system, why they interact and how they interact. These interactions remain influential when studying complexity. Third, Edmonds (1999) proposes that complexity is the model property that makes formulating its overall behaviour in a given language difficult, even when given reasonably complete information about its atomic components and their inter-relations (Vidal and Marle 2008).

Sahin *et al.* (2013) defines complexity as a behaviour that emerges from the way the components of the system are interconnected, but not how the components of the system are themselves complex, although the components, people are themselves as complex themselves because they are naturally complex adaptive systems (Wilkinson 2006). Similarly, Stacey (1995) argues that organizations are made up of complex non-linear interactions acting with a number of their associated behaviours, which will exhibit a pattern of behaviours. Introducing the understanding of complexity in a PMS would

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## Complex Systems and Complexity Thinking

Hager<sup>1</sup>, David Beckett<sup>2</sup> • [Institutions \(2\)](#)

Dec 2018 • pp 155-183

**DR:** The aim of this chapter is to present a coherent version of complexity thinking, one that suggests novel and fertile understandings of the unresolved issues identified in previous chapters, and to demonstrate the power of complexity Thinking to open and expand the understanding of these pressing issues.

**Abstract:** This chapter introduces fundamental aspects of what is popularly called complexity theory, though, for reasons explained in the chapter, we prefer the term complexity thinking. The concept of complexity and its accompanying cluster of key ideas, such as action, nonlinear relations and emergence, is outlined and discussed. Crucially, the chapter distinguishes between restricted complexity and general complexity. Whilst restricted complexity has proven to have wide applicability within mathematics and the natural sciences, we argue that it is general complexity that is more relevant to major portions of the human and social sciences. This chapter also identifies and discusses three kinds of emergence, concluding that it is weak emergence that is vitally important for the human and social sciences. Though complexity thinking remains a contested field of inquiry, this chapter does not attempt to resolve ongoing disputes within complexity thinking itself. Rather its aim is to present a coherent version of complexity thinking, one that suggests novel and fertile understandings of the unresolved issues identified in previous chapters. It is the task of the remaining chapters of the book to demonstrate the power of complexity thinking to deepen and expand our understanding of these pressing issues.

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### Abstract

This chapter introduces fundamental aspects of what is popularly called complexity theory, though, for reasons explained in the chapter, we prefer the term *complexity thinking*. The concept of complexity and its accompanying cluster of key ideas, such as reduction, nonlinear relations and emergence, is outlined and discussed. Crucially, the chapter distinguishes between *restricted complexity* and *general complexity*. Whilst restricted complexity has proven to have wide applicability within mathematics and the natural sciences, we argue that it is general complexity that is more relevant to major portions of the human and social sciences.

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keyword combination search yielded 10,589 outputs ment/Business (WOS), Business, Management and

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S. Okwir et al.

Table 2. Keyword analysis and articles until 2017

Keywords	Until 2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
performance management	79	16	22	19	32	28	34	40	37	44	65	65	48	529
performance measurement	313	41	58	66	70	77	63	67	61	90	108	102	99	1215
performance appraisal; performance control; performance complexity; performance strategy; supply chain performance; performance measurement system; performance management system; performance measurement and management; organisational performance; organizational performance	308	36	46	50	65	81	81	90	81	96	122	153	155	1364
performance assessment; performance indicators	595	80	104	112	127	156	154	213	213	238	305	332	354	2983
<b>Total</b>	<b>1295</b>	<b>173</b>	<b>230</b>	<b>247</b>	<b>294</b>	<b>342</b>	<b>332</b>	<b>410</b>	<b>392</b>	<b>468</b>	<b>600</b>	<b>652</b>	<b>656</b>	<b>6091</b>

Ask a question about this document...

The document is a compilation of various articles and studies related to performance measurement and management. It does not have a specific set of results as it is a review of existing literature on the topic.

Pages: [78](#), [20](#), [21](#), [22](#), [23](#)

Which are the main findings of paper?

The paper is a compilation of various articles and studies related to performance measurement and management. Each subsection discusses different findings related to the topic, such as the sources of complexity in performance management systems, the use of complexity theory to understand PMS, the importance of understanding the unique context in which a PMS is operating, and the impact of PMS on organizational performance. Therefore, there are no specific main findings of the paper as a whole, but rather a collection of findings from the different subsections.

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# Performance Measurement and Management Systems: A Perspective from Complexity Theory

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and the impact of PMS on organizational performance. Therefore, there are no specific main findings of the paper as a whole, but rather a collection of findings from the different subsections.



Resume the main results of paper?

As mentioned earlier, the paper is a compilation of various articles and studies related to performance measurement and management. Therefore, it does not have specific main results. However, the paper provides insights into the complexity of performance management systems (PMSs) in organizations, the sources of complexity, and the use of complexity theory to understand PMSs. It also discusses the importance of understanding the unique context in which a PMS is operating and the impact of PMSs on organizational performance. Additionally, the paper provides a comprehensive list of academic sources on performance measurement and management systems, including their implementation, impact, and effectiveness.

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# Performance I and Management Sys from Comple

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Systematic review of the literature on Digital Twin: a discussion of contributions and a framework proposal  
Revisão sistemática da literatura sobre Digital Twin: discussão sobre contribuições e proposta de um framework

Maraschalchi Da Cruz; Luiz; Tonin []

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### What this paper is about 1

Just as there is an increase in the number of publications about Industry 4.0, there is also an increase in the number of publications that address DT models, but it is possible to notice a lack of practicality to have access to these models, as well as to build them.

**With that came the interest of exploring an alternative for the construction of a DT model using free open source software, and one of the platforms that could support all the functions and requirement seen are the Game Engines, software created for the construction of video games, capable of providing good visualizations, physical simulations on objects, integrating artificial intelligence models and that are highly customizable, being, for example, used in markets such as architecture, assisting in the visualization of off-plan properties.**

In order to elaborate this framework proposal with the main steps necessary for the construction of a

### What you can learn 2

Moving on to an analysis of the main journals publishing these articles, it is observed that at least 7 journals have more than 10 registered publications, accounting for about 80% of the total records of the 332 publications under analysis.

Finally, looking only at the clipping of articles that loaded their keywords from the StArt software import, as seen in, the 5 most cited were Digital Twin followed by Industry 4.0.

After the proper reading and compilation of data/information, it was possible to observe commonalities in the Digital Twin studies, as well as points that diverge from one work to the other, mainly, the discussions focus on the architecture of model construction, communication between real and digital environment, data and information management and the functionalities/uses of the models, points that will be discussed individually in the next topics.

With this, the generic step-by-step for building a Digital Twin model within a game engine is finalized, these are the main steps that will be taken to build a model, but depending on the process, some changes may be necessary, as well as the insertion of more steps, aiming to behave what is expected within the Unity environment. This study contributes to the attempt to collaborate with the dissemination of themes related to the Digital Twin models, both in the academic environment and in practical applications, aiming above all to seek ways at no cost to build and have access to these models. This study also highlights the growing number of publications on Digital Twin in recent years and the existence of different definitions regarding the characteristics, functionalities and uses of these models.

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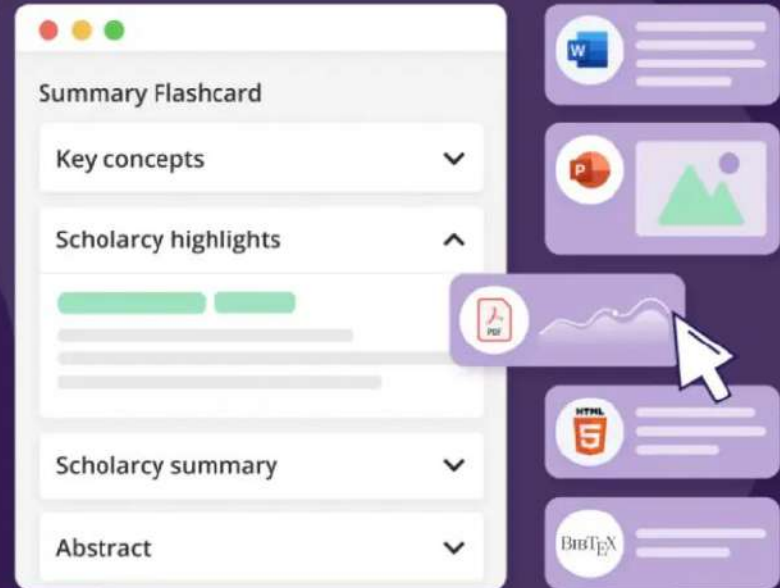


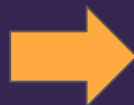
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## Capabilities

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## Limitations

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Rewrite with formal, academic style the following abstract

Purpose – Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has been influencing those systems distinctly. Thus, the aim of this article is to know the influence of big data analytics on the characteristics of PMSs.

Research method – Systematic review of the literature of academic papers with studies of the use of BDA technologies in PMS.

Findings – BDA allows new performance measures implementation as well as the improvement of existing ones. The changes in the elements of PMSs bring benefits, such as real-time performance



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This study aims to investigate the impact of big data analytics (BDA) on the characteristics of performance measurement systems (PMSs), which play a crucial role in the functioning of organizations. A systematic literature review of academic papers examining the use of BDA technologies in PMS was conducted to achieve this aim.



The findings suggest that BDA enables the implementation of new performance measures and improves existing ones. This leads to changes in the elements of PMSs, which bring several benefits such as real-time performance measurement, the ability to perform predictive analysis and simulations, better dissemination of information, and the maturation of PMSs. However, several challenges need to be overcome for successful implementation and use of BDA in PMS, including the involvement of senior management and other levels of the organization and the creation of intangible capabilities for generating insights.



It is important to note that the results cannot be generalized due to the limitations of the research. Nonetheless, the study has practical implications as it can assist future academic work and organizational projects aiming to implement BDA in PMS. The originality and value of this article lie in its detailed examination of the new scenario for PMSs in the face of the large volume of data available.

 Regenerate response



Web access

1 result

Any time

Any region

Default English

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QuillBot will rewrite your text. Start by writing or pasting something here and then press the Paraphrase button.



**Paraphrase**

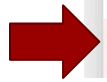
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Purpose - Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has been influencing those systems distinctly. Thus, the aim of this article is to know the influence of big data analytics on the characteristics of PMSs. Research method - Systematic review of the literature of academic papers with studies of the use of BDA technologies in PMS. Findings - BDA allows new performance measures implementation as well as the improvement of existing ones. The changes in the elements of PMSs bring benefits, such as real-time performance measurement, the possibility of performing predictive analysis, simulations and better dissemination of information, in addition to the maturation of PMSs. However, it is necessary to overcome some challenges for its implementation and use, such as the involvement of senior management and other levels of the organization and the creation of intangible

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**Paraphrase**



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Synonyms:

Purpose - Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has been influencing those systems distinctly. Thus, the aim of this article is to know the influence of big data analytics on the characteristics of PMSs.

Research method - Systematic review of the literature of academic papers with studies of the use of BDA technologies in PMS.

Findings - BDA allows new performance measures implementation as well as the improvement of existing ones. The changes in the elements of PMSs bring benefits, such as real-time performance measurement, the possibility of performing predictive analysis, simulations and better dissemination of information, in addition to the maturation of PMSs. However, it is necessary to overcome some challenges for its implementation and use, such as the involvement of senior management and other levels of the organization and the creation of intangible

Goals - Performance measurement systems (PMS) are essential to any organization's operation. But big data has been significantly affecting those systems. The purpose of this article is to understand how big data analytics has affected the characteristics of PMSs.

Research approach: Systematic examination of academic literature that includes studies on the application of BDA technology in PMS.

Findings - BDA enables the installation of new performance measures as well as the enhancement of existing ones. In addition to the development of PMSs, the changes in the components of PMSs offer advantages such real-time performance assessment, the ability to undertake predictive analysis, simulations, and better information dissemination. However, in order to use and apply it various obstacles must be overcome.

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198/125 Words

Rephrase

1/7 Sentences • 117 Words

- Paraphraser
- Grammar Checker
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Synonyms: 

Purpose - Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has been influencing those systems distinctly. Thus, the aim of this article is to know the influence of big data analytics on the characteristics of PMSs.

Research method - Systematic review of the literature of academic papers with studies of the use of BDA technologies in PMS.

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Limitations of the research - impossibility of generalizing the results.

Practical implications - assist in future academic work and organizational

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Rephrase

2/7 Sentences • 117 Words

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Hide Assistant

Purpose - Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has been influencing those systems distinctly. Thus, the aim of this article is to know the influence of big data analytics on the characteristics of PMSs.

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Limitations of the research - impossibility of generalizing the results.

organizational projects of BDA implementation in PMS.

All 19
Grammar 15
Sentence suggestions 4



2 sentence suggestion(s) available only for Premium users.

- Replace with Ignore

⋮
- Remove extra space.

▮
- Replace with

method
- Replace with

a
- Remove the capitalization

systematic



This paper aims to present the results of using QuillBot to improve a paper's readability.

1 [ Paraphrase [ Summarize [ Suggest Text [ 15 Words ^ [ 0 [ [ [ ]

Modes: Standard [ Synonyms: [ ]

This essay aims to demonstrate how using QuillBot can increase a paper's readability.

2

3

[ [ [ Insert [ Rephrase





Modes: Standard Synonyms:

This essay aims to demonstrate how using QuillBot can increase a paper's readability.



QuillBot is an AI-powered writing assistant that uses machine learning algorithms to paraphrase and simplify text. The study conducted in this paper evaluates the effectiveness of QuillBot in enhancing the clarity and coherence of written communication.

QuillBot is a powerful tool that uses AI to paraphrase and reword text, making it more concise and easier to understand. The study conducted in this paper provides insights into the effectiveness of QuillBot in enhancing the readability of academic writing.

QuillBot is a powerful AI-based tool that can rephrase sentences and paragraphs to make them more concise and easier to understand. The study found that using QuillBot resulted in a significant improvement in the readability of the paper.

Paraphrase Summarize Suggest Text 15 Words



Insert Rephrase



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Summarizer ⓘ

Key Sentences **Paragraph**

Summary Length: Short  Long

**Purpose** – Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has been influencing those systems distinctly. Thus, the aim of this article is to know the influence of big data analytics on the characteristics of PMSs.

**Research method** – Systematic review of the literature of academic papers with studies of the use of BDA technologies in PMS.

**Findings** – BDA allows new performance measures implementation as well as the improvement of existing ones. The changes in the elements of PMSs bring benefits, such as real-time performance measurement, the possibility of performing predictive analysis, simulations and better dissemination of information, in addition to the maturation of PMSs. However, it is necessary to overcome some challenges for its implementation and use, such as the involvement of senior management and other levels of the organization and the creation of intangible capabilities for creating insights.



This article examines the influence of big data analytics on performance measurement systems (PMSs). It finds that BDA can bring benefits such as real-time performance measurement, predictive analysis, simulations, and better dissemination of information. However, it is necessary to overcome challenges such as senior management involvement and intangible capabilities for creating insights.

Select keywords ⓘ

- critical role
- BDA technologies
- BDA implementation
- big data

198 Words

Summarize

3 Sentences • 52 Words

Paraphrase Summary





## Melhore seu texto em poucos segundos

Escreva textos de forma clara, precisa e simples

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Purpose – Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has been influencing those systems distinctly. Thus, the aim of this article is to know the influence of big data analytics on the characteristics of PMSs.

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Limitations of the research – impossibility of generalizing the results.

Practical implications – assist in future academic work and organizational projects of BDA implementation in PMS.

Originality/value – The originality of this article is based on detailed information about a new scenario for PMSs in the face of the large volume of data available.



1346 / 3000

Purpose - Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has a significant impact on these systems. Thus, the purpose of this article is to know the influence of big

**Alternativas** Frase inteira Palavra

However, big data has had a significant impact on these systems.

However, big data has significantly influenced these systems.

But big data is having a significant impact on these systems.

However, big data analytics has had a significant impact on these systems.

creation of intangible capabilities for generating insights.  
Research limitations - inability to generalize the results.  
Practical implications - support for future academic work and organizational projects of BDA implementation in PMS.  
Originality/value - The originality of this article is based on the detailed information about a new scenario for PMS in the face of the large volume of data available.



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## &lt; Rewrite Content



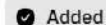
## Rewrite Content



Share

Rewrite content in a different way, while keeping the same meaning.

HyperWrite



Added

## Original Content

**Purpose** – Performance measurement systems (PMS) play a critical role in the functioning of any organization. However, big data has been influencing those systems distinctly. Thus, the aim of this article is to know the influence of big data analytics on the characteristics of PMSs. **Research method** – Systematic review of the literature of academic papers with studies of the use of BDA technologies in PMS. **Findings** – BDA allows new performance measures implementation as well as the improvement of existing ones. The changes in the elements of PMSs bring benefits, such as real-time performance measurement, the possibility of performing predictive analysis, simulations and better dissemination of information, in addition to the maturation of PMSs. However, it is necessary to overcome some challenges for its implementation and use, such as the involvement of senior management and other levels of the organization and the creation of intangible

## Instructions

improve readability keeping academic, formal style

*This tool produces the following:*

The original content rephrased so that the original structure and content are still there but it's now better in the way the instructions ask

Smarter

Faster

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## Results

## três opções

**Objective** – The critical role of Performance Measurement Systems (PMS) in organizational functioning is well-established, but the notable impact of big data on these systems requires further exploration. Consequently, this article investigates the effects of big data analytics on PMS characteristics.

**Research Approach** – A systematic review of academic literature, focusing on studies that discuss the integration of Big Data Analytics (BDA) technologies into PMS, was conducted.

**Outcomes** – BDA enables the introduction of new performance indicators and enhances current ones. Alterations made to PMS elements yield advantages, such as real-time performance assessment, predictive analysis capabilities, simulation execution, improved information dissemination, and PMS maturation. Nevertheless, implementing and utilizing BDA presents challenges that need to be addressed, including securing the commitment of senior management and other organizational levels, and fostering intangible capacities to generate insights.

**Research Constraints** – The results obtained in this study cannot be generalized.

**Practical Application** – The findings offer valuable insights for future academic endeavors and organizational projects involving BDA implementation in PMS.


**Originality/Significance** – This article's distinctiveness lies in its comprehensive examination of an emerging PMS landscape brought about by the vast amount of data currently available.

**Objective** – The critical role of performance measurement systems (PMS) in organizational functioning is well-established. However, big data has been uniquely impacting these systems. This article seeks to explore the influence of big data analytics on the attributes of PMSs.

**Research Approach** – A systematic literature review of academic papers that study the use of big data analytics technologies in PMS was conducted.

**Outcomes** – Big data analytics enable the introduction of new performance measures and enhance existing ones. Alterations in PMS components yield advantages, such as real-time performance evaluation, predictive analysis capabilities, simulation opportunities, and superior information dissemination, leading to PMS maturation. Nevertheless, certain


This tool requires the Chrome extension

 Get Extension

Results




## Flexible Link Assistant

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A flexible AI assistant that takes the information from the provided source (website link) and completes the user request.

HyperWrite 

 Added

### Source Link

Enter a URL

### Request

Summarize

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Fill in the fields to generate your results





## Expert Writing Assistant

Share

This tool will act as an expert AI-powered writing assistant. Ask the assistant to write drafts, improve your writing, give advice, and more!

Jason Kuperberg

Add to Library

### Writing Task

This paper aims to present the results of experimenting HypeWrite to improve 25 papers' readability.

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Provide expert advice and assistance on the specified writing task.

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Faster

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### Results

Output: In order to effectively present the results of your experimentation with HypeWrite for improving the readability of 25 papers, consider the following advice:

1. Begin with a clear and concise introduction that outlines the context, purpose, and significance of the study.
2. Define key concepts, such as HypeWrite and readability, to ensure that readers understand the focus of your research.
3. Explain your methodology for selecting the 25 papers as well as how you utilized HypeWrite to improve their readability.
4. Present the results in a clear and structured manner, using tables, charts, or figures to visually represent any significant data or patterns.
5. Compare and analyze the readability scores before and after using HypeWrite, discussing any trends or noteworthy findings.
6. Address any limitations of your study and suggest areas for future research or improvement in using AI-powered writing assistants.
7. Conclude by summarizing the implications of your findings and highlighting their relevance to both academic research and practical applications.

By following these guidelines, your paper will effectively communicate the outcome of your study while maintaining clarity and focus on your primary objective of assessing HypeWrite's impact on readability improvement.

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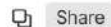
This tool uses your Chrome extension



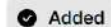
## Flexible Link Assistant

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HyperWrite



Share



Added

### Source Link

<https://doi.org/10.1590/1806-9649-2022v29e9621>

### Request

Summarize the content

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Faster

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### Results

The study aimed to investigate the definitions, requirements, and applications of Digital Twin (DT) models using a systematic literature review from Science Direct, Scopus, and Web of Science. The method involved bibliometric analysis of 332 articles and content analysis of 17 filtered articles relevant to the framework proposal. The results showed that authors have different definitions and processes for creating a DT, which represents real-world elements for performance monitoring, scenario simulation, and decision-making. Researchers often used software without trial licenses or student versions. Based on these findings, the study



# Usando Chrome Extension


The image shows the HyperWrite Chrome extension interface. At the top left, the HyperWrite logo is visible next to a text input field labeled "Enter a descriptive title". To the right of this field are navigation buttons for "Tools", "Support/Feedback", "Join our Discord", and a blue "Saved" button. Below the title field is a rich text editor toolbar with icons for bold (B), italic (I), underline (U), list (☰), link (🔗), and unlink (🔗), along with a "Normal" style dropdown menu. On the right side of the editor, the "TypeAhead Mode" is set to "Always", and the "Word Count" is 172.

The main text area contains the following paragraph:

Performance measurement systems (PMS) play a critical role in performance management. Big data analytics (BDA) can positively influence PMS elements. This article aims to analyze the empirical results on the effects of using big data analytics in performance measurement systems. We applied a systematic literature review on a sample of eleven articles indexed in the SCOPUS scientific index after analyzing a large sample after applying a search string. The results show that the BDA supports the addition of new performance measures and improves some of the existing ones. Changes in PMS elements bring benefits such as real-time performance measurement, application of predictive analytics, simulations and better information dissemination. However, it is imperative to overcome some challenges, such as the involvement of senior management and other levels of the organization, and the creation of intangible capabilities to produce insights. The present article contributes to the literature by providing new empirical evidence on the effects of using BDA in PMS. It identifies key success factors for implementation and provides practical recommendations for improving PMS.

On the right side, there is a sidebar with a vertical scroll bar. At the top of the sidebar are two tabs: "AutoWrite" (selected) and "Template". Below the tabs is a question: "What do you want to write about?". A text input field contains the text: "Abstract scientific paper on how big data analytics affects the performance measurement systems". To the right of the input field, it shows "95/300" characters and a "Best Practices" link. At the bottom of the sidebar is a blue "AutoWrite" button with a lightning bolt icon. On the left side of the sidebar, there are three icons: a robot head, a "New!" badge over a speech bubble, and a gear icon.


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Enter your abstract and get a title.

  
**Paraphraser**  
Enter an academic sentence and have it rephrased.

  
**GPT Detector**  
See if a text comes from GPT-3, GPT-4, or ChatGPT.

  
**Abstract Generator**  
Enter your text and get an abstract

  
**Academizer**  
Enter an informal sentence and get an academic rewrite.

*Requires API*

Options ▾

- Signed in as ram@dep.ufscar.br
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- Account
- Sign out

# Agenda

- Considerações sobre inteligência artificial
- Contexto sócio-econômico da aplicação da AI
- ChatGPT como um/a assistente
- ChatGPT no processo de pesquisa
- **Provocações finais**

# Provocações Finais

- Humano deve permanecer no comando
  - julgamento e discernimento
  - ética
  - criatividade e inovação
  - inédito
- Podemos ter um/a assistente para algumas etapas
  - com ganhos de produtividade e qualidade
- Curadoria sempre!
- Muitos apps são pagos
  - ficaremos para trás?

Obrigado pela atenção!

Q/A