# **Proceedings of**

2020 International Conference on Information Management and Technology (ICIMTech)

13 - 14 August 2020 Indonesia



# ICIMTech 2020

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# **Greetings!**



Dear Esteemed Participants/Researchers/Delegates/Professors
Distinguish Guests
Ladies and Gentlemen

Welcome to 2020 International Conference on Information Management and Technology (ICIMTech 2020) held virtually in Indonesia. This is the 5<sup>th</sup> international conference that annually organized by School of Information Systems, Bina Nusantara University. Today ICT plays a very important role in the industry community to interact, exchange information, and to support business processes that they move to digital transformation. So, our theme of this conference is **Fostering Innovation in The ICT Ecosystem.** 

First of all, I would like to extend my sincere appreciation to IEEE Indonesian Section for continuous support and to the honorable keynote speakers for sharing knowledge and research experiences. I thank you very much to committees and volunteers, especially from School of Information Systems. I proudly inform that ICIMTech 2020 received 392 papers and 178 high quality of papers were accepted and would be presented in this conference. They are from several countries overseas and Indonesia. More than that we have experts from academia and professionals will share their knowledge and research experiences related with our theme of conference. We believe you will enjoy and improve your knowledge and experiences as well.

This event is a great opportunity for social networking and there are discussions among us in current and latest Information Management and Technology. Hopefully, as researchers, academicians, professionals, and students from various research background will contribute on improvement of knowledge and experiences, especially in the area of Big Data and Data Mining, Business Intelligent, e-Business, Human-Computer Interaction, Information Engineering, Knowledge Management, Information System Audit, Management Information System and Strategic Information System. On behalf of the committee, let me extend a warm welcome to Indonesia, especially to all foreign participants. I hope that this event will be pleasant and memorable. Thank you and enjoy the conference!

Sincerely Yours,

<u>Dr. Tanty Oktavia</u> Conference Chair ICIMTech 2020







The 5<sup>th</sup> International Conference on Information Management and Technology (ICIMTech)
Jakarta, 13 August 2020

H.E. Prof. Dr. Ir. Harjanto Prabowo, MM., Rector, BINUS University Vice rectors, Directors, Deans, and Professors,

Distinguished guests, ladies, and gentlemen,

Let us praise to God the Almighty for His merciful and blessings as we gather here to attend The 5<sup>th</sup> International Conference on Information Management and Technology (ICIMTech) 2020 as part of BINUS Joint International Conference (BJIC) 2020.

This year BJIC consists of 5 international conferences covering many disciplines ranging from sustainability and development, information management, engineering, technology, computer science, business, international relations, social science, and humanities, namely:

- 1. International Conference on Biospheric Harmony (ICOBAR), chaired by Dr.Eng. Nico Surantha, S.T., M.T., was held virtually, 23 -24 June 2020
- 2. International Conference on Information Management and Technology (ICIMTech), chaired by Dr. Tanty Oktavia., S.Kom., MM., is held today, 13 14 August 2020.
- 3. International Conference on Business, International Relations and Diplomacy (ICOBIRD), chaired by Dr. Lili Yulyadi, B.IRK., B.HSc., M.HSc. will be held virtually, 24-25 September 2020
- 4. International Conference on Eco Engineering Development (ICEED), chaired by Religiana Hendarti, ST, MT, Ph.D, IAI, will be held virtually, 10 11 November 2020.
- 5. International Conference on Computer Science and Computational Intelligence (ICCSCI), chaired by Dr. Aditya Kurniawan, S.Kom., MMSI., will be held virtually, 19 20 November 2020





The 5<sup>th</sup> ICIMTech, specifically, aims to bring together researchers and experts in information systems to share their ideas, experiences, and insights. ICIMTech is organized by School of Information Systems, Bina Nusantara University and supported by IEEE Indonesia Section. ICIMTech 2020 would focus on the issues and challenges of Fostering Innovation in the ICT Ecosystems; delivered through the keynote speakers and distinguished lecturers.

Distinguished guests, ladies, and gentlemen,

This conference is also very special, because our keynote speakers are prominent scholars and professionals from New Zealand, Japan, and Indonesia who contribute to the discussion of new insights about information systems from their perspective as academician, professionals and expert from different fields. This conference shows the bold commitment of BINUS University as world class university that ranked 801-1000 in QS WUR 2020 to continuously produce, share knowledge, and foster and empower the society. Therefore, I do appreciate for their contribution to these conferences.

Last but not least, I would like to appreciate all chairpersons of the 5 conferences and committee members who have been working very hard to make this conference possible. I would also like to thank presenters, participants, our reviewers, and publishers of the paper presented in the conferences as well as sponsor of this event. I hope you enjoy the conference!

Thank you abundantly.

Jakarta, 13 August 2020

Prof. Dr. Tirta N. Mursitama, PhD General Chair BJIC 2020



# Welcome Message



Welcome to the 5<sup>th</sup> International Conference on Information Management and Technology (ICIMTech 2020) held from 13-14 August virtually. This is the fifth conference hosted by School of Information Systems, BINUS University (Bina Nusantara University). And for this year more than 200 delegates worldwide participate in the conference as participants and presenters. We are very excited to have all of you to join in this great event.

Since five years ago through this conference, we believe many young researchers have been helped to develop their research work and skills through constructive interaction with experienced academics. We find this encouraging and we will continue to develop initiatives that provide information, communication and technology of young researchers with opportunities to develop their research potential and ideas.

Learning from mature research and stimulating discussion with academics, practitioners, and more experienced researchers in the conference has turned ICIMTech to be a melting pot of multi-generation researchers. This is important for developing countries and many high-quality papers related to this issues will be presented in the conference. In addition to paper presentation, we also invite experts from academia to share their knowledge and research experience in keynote speeches session. We believe you will find the conference very fruitful in enhancing your knowledge.

We congratulate the authors of papers that made it into the proceedings and to IEEE Xplore, for the job well done. We wish to express strong appreciation to our most important sponsors: BINUS University and IEEE Indonesia Section. We are also blessed to have three distinguished Guest Speakers: Professor Michael D. Myers, Professor Seiichi Kawata, and Professor Dr. Wisnu Jatmiko. As always, many thanks are due to all members of ICIMTech committee for their dedication for making this conference a success. Above all, thank you to all of you for participating to this conference. Our conference next year ICIMTech 2021 in Indonesia and we look forward to seeing all of you again and hope you enjoy the virtual conference this year.

Sincerely Yours,

Yohannes Kurniawan

Dean of School of Information Systems Bina Nusantara University



# WELCOMING REMARKS Rector BINUS University

Distinguished keynote speakers, Fellow professors and presenters, Ladies and gentlemen,



It is a great honor for me to welcome you to the 5<sup>th</sup> International Conference on Information Management and Technology (ICIMTech) virtually hosted by BINUS University. This year marks the success of BINUS university achieving vision of 2020 as World Class University. We have been ranked 801 – 1000 in QS World University Ranking 2021 and ranked 7th among public and private universities in Indonesia.

We realized that contribution of research and publication is indispensable in achieving this prestigious status. This conference is also part of continuing efforts in producing, deliberating, and disseminating knowledge as well as creating research partnerships between faculty members and distinguished scholars from many universities in the world.

This year is a historical moment for BINUS University as we have launched our new vision 2035 that underlined the clear message of fostering and empowering the society in building and serving the nation. In the area of research, we would produce high impact research for society. Therefore, an international conference that focuses on creating the future by improvement and advancement of information systems and aims to encourage fostering innovation in ICT ecosystem is essential to make university stay relevant to the needs of the modern societies.

Ladies and gentlemen,

I would like to express my highest appreciation to all invited keynote speakers and invited plenary session speakers and all presenters and participants who will make this conference meaningful. I strongly advice to make use of this conference wisely, not limited to discussing about research but also actively trying to build connections for a new joint research, publication, faculty exchanges and so on.

Finally, I also thank all the chairmen and committee members of the conference. I wish all of you great conference and make new acquaintances during the conferences virtually.

Thank you very much. Jakarta, 13 August 2020

Prof. Dr. Ir. Harjanto Prabowo, MM Rector, BINUS University





# WELCOMING REMARKS IEEE INDONESIA SECTION



**Prof. Dr.Eng Wisnu Jatmiko, SMIEEE**Chair, IEEE Indonesia Section



**Dr. Kurnianingsih, SMIEEE**Vice-Chair, IEEE Indonesia Section

Dear Distinguished Guests, Colleagues, researchers, professionals, ladies, and gentlemen.

Good morning, a prosperous, warm, and spirited greeting.

On behalf of IEEE Indonesia Section, we would like to extend our warmest welcome to all keynote speakers, presenters, and participants to the 5<sup>th</sup> International Conference on Information Management and Technology (ICIMTech 2020). The conference theme is "Fostering Innovation in The ICT Ecosystem". Due to this year's pandemic situation, ICIMTech 2020 was held as a completely virtual conference. I also want to thank all of you who have joined this conference.

ICIMTech is an annual international conference organized by the School of Information Systems, Bina Nusantara University and technically co-sponsored by IEEE Indonesia Section. The conference aims to bring together researchers and experts in information systems to share their ideas, experiences, and insights.

IEEE Indonesia Section has conducted many activities over 32 years in Indonesia. In terms of collaboration, IEEE Indonesia section has a good and mutual relationship with ICT organizations, Industries, Government, Universities as well as the Community in Indonesia. IEEE Indonesia Section has contributed to about 50 different International conferences annually, and this conference is one of the conferences that were initiated by IEEE Indonesia Section. As the fifth year of ICIMTech, this conference shows it's sustainability due to the hard work of the conference organizers, well-organized conference and high-quality papers. We do hope in the near future some high-quality conferences will be continued and strengthened, so the result will give more benefit and positive impact on the human being, especially to Indonesian people.

Finally, we do hope all of you will have an enjoyable and valuable experience during this event. You may share your best knowledge in your area of research and professional activities.

Thank you.

Jakarta, 13 August 2020

IEEE Indonesia Section



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# A Study of Digital Entrepreneurship through Bibliometric Visualizing from 1993 to 2019

Agung Purnomo
Entrepreneurship Department,
BINUS Business School Undergraduate
Program
Bina Nusantara University
Jakarta, Indonesia 11480
agung.purnomo@binus.ac.id

Triana Susanti
Accounting Department
Sekolah Tinggi Ilmu Ekonomi
Mahardhika
Surabaya, Indonesia
trianas0807@gmail.com

Anita Kartika Sari

Management Department

Sekolah Tinggi Ilmu Ekonomi

Mahardhika

Surabaya, Indonesia

anitakartikasari2019@gmail.com

Mega Firdaus

English Language Education Department
Universitas Nahdatul Ulama Sidoarjo
Sidoarjo, Indonesia
megafirdaus22@gmail.com

Rina Dewi

Management Department
Universitas 45 Surabaya
Surabaya, Indonesia
rinadewisoesyra@gmail.com

Abstract—Digital entrepreneurship continues to grow. It research yet the notion about digital entrepreneurship review study which showed the big picture using data from all countries. This research aimed to map the status of digital entrepreneurship studies published internationally indexed by Scopus using bibliometric visualization. Bibliometric methods and analyzed research data were implemented by using the analysis search results service from the VOS viewer application and Scopus. The research data of 115 documents published from 1993 to 2019 were obtained from the Scopus database. The results showed that the most productive of countries, institutional affiliations, and individuals in the publication of digital entrepreneurship studies were the United States, Universität Liechtenstein, and Kraus, S. The most document type and study areas in digital entrepreneurship studies were Article and Business, Management and Accounting. There was one pattern of collaborative researchers in digital entrepreneurship studies. This research asserted a convergence axis classification consisting of digital entrepreneurship studies to characterize the body of knowledge generated from three decades of studies: Innovation, Digitalization, Entrepreneurship, Business development, Business models, E-commerce, and Social media, abbreviated as IDEBBES themes.

Keywords—digital entrepreneurship, entrepreneurship, bibliometric, scopus, vos viewer

#### I. INTRODUCTION

Digitalization develops the process of modern Entrepreneurial activities are often entrepreneurship. described as solutions to global socio-economic challenges such as inequality and poverty [1], [2], as well as the pathway to personal emancipation [3]. Entrepreneurship involves efforts in recognizing and seizing opportunities. Entrepreneurship transforms chances into products or services available for market [4]. The digitalization of the entrepreneurial process has assisted to break boundaries between different phases and bring a greater degree of uncertainty into how they develop [5]. Digital entrepreneurship can be defined as an entrepreneurship pursuing potential profits based around the use of digital technology as well as other ICTs [6]. Digital

entrepreneurship is also understood as an entrepreneurial subcategory in which some or all physical assets in traditional organizations have been digitized [4] or as sales of online goods or services through e-networks [7]. Digital entrepreneurship has been seen as an important pillar of entrepreneurial work for economic development, job creation, and innovation in many countries [8].

Digital entrepreneurship continues to develop its main activities, characteristics, categories, and roles. The main activities of digital entrepreneurship include several fields namely decisions on potential evaluation, decisions on company entry, decisions on leveraging opportunities, and exit strategy [9]. Digital entrepreneurship links the characteristics of traditional entrepreneurship with the peculiarities of the digital sphere, creativity, better sensitivity to risk, or dexterity [10]. Digital entrepreneurship can be divided into three categories. The first is light digital entrepreneurship, where the digital economy is only involved as a complement to more traditional processes. The second category is moderate digital entrepreneurship, which cannot exist without digital infrastructure and requires the business to focus on digital products or other digital components. The latter is extreme digital entrepreneurship, which implies all business processes namely production, services, advertising, and digital distribution [4]. Theoretically, digital entrepreneurship has a very significant role in creating new businesses and entrepreneurs. This was related to how the mechanism of business formation which generally depended on the industrial sector, institutional characteristics, talents, and experiences of the entrepreneurs [11], [12].

There was a significant gap problem in the conceptualization of entrepreneurship focuses on digital entrepreneurship [13]. A deeper understanding is needed about the phenomenon of digital entrepreneurship. Digital entrepreneurship will become more common as a digital activity in all industries increased [14]–[16]. Generally, previous studies related to digital entrepreneurship were limited to study in one field [17], or one country [18]. The problem was limited studies reviewing research in the field of digital entrepreneurship that shows a big picture map

which visualized annual data from all countries. Also, there is no digital entrepreneurship study that specifically addresses the relationship between authors, affiliations, keywords, and the impact of the research. Therefore, this research purposed to portray the status of digital entrepreneurship studies published internationally indexed by Scopus using bibliometric visualization.

#### II. RESEARCH METHODS

This research has mapped visual trends in digital entrepreneurship studies since it has been published internationally in the last 26 years and have been indexed by Scopus. The data used were gathered from the Scopus database using the document search service in April 2020 [19]. Hence bibliometric methods and analyzed research data were applied to analyze search results service from Scopus and the VOSviewer application [20], [21]. The VOSViewer tool is used to build and visualize bibliometric networks, namely the number of studies, researchers, academic affiliations, countries, fields, keywords, and author collaboration [22]. This research has been carried out by identifying keywords related to digital entrepreneurship to search for and identify related articles from within the Scopus database for 115 documents published from 1993 to December 2019. The data was limited for retrieval data 2019 without looking at 2020 (exclude 2020) thus the annual data obtained describe the condition of the study during the whole year from January to December. The query command that is applied when mining data on Scopus is TITLE-ABS-KEY ("digital entrepreneurship") AND PUBYEAR <2020).

An author analysis co-authorship units and full counting methods using VOSViewer were carried out to get the author's collaboration network. The study implemented a co-occurrence analysis along with keywords analysis and a full calculation method using VOSViewer to obtain a portray of digital entrepreneurship studies.

### III. RESULT AND DISCUSSION

The highest peak of publication is 2019 with 52 documents. The publication of digital entrepreneurship studies has been started since 1993.

### A. Most Common Country Affiliations of Digital Entrepreneurship Studies

The country with the largest contribution in the publication of digital entrepreneurship studies was the United States with 19 documents. It was followed by the United Kingdom with 14 documents, Australia with 13 documents, Germany with 12 documents, China with 9 documents, France with 9 documents, Denmark with 7 documents, Iran with 7 documents, Italy with 6 documents, Liechtenstein with 6 documents, and Spain with 6 documents.

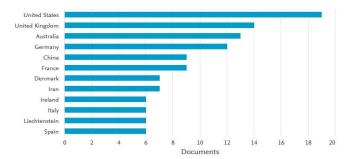


Fig. 1. Number of Documents by Country of the Digital Entrepreneurship Studies

# B. Documents based on Higher Education Affiliates from the Digital Entrepreneurship Studies

The most productive research institute in the publication of digital entrepreneurship studies was Universität Liechtenstein with 6 documents. Followed by The University of Warwick with 5 documents, Lappeenrannan Teknillinen Yliopisto with 4 documents, Politecnico di Milano with 4 documents, University of New South Wales UNSW Australia with 4 documents, and the Queensland University of Technology QUT and Dublin Technological University with 3 documents.

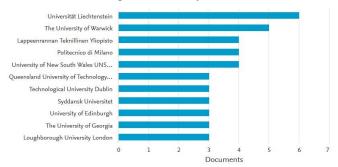


Fig. 2. Documents Number based on Higher Education Affiliates from the Digital Entrepreneurship Studies

### C. Documents Bbased on Authors of the Digital Entrepreneurship Studies

The author with the most publications in the digital entrepreneurship studies was Kraus, S., with 5 documents. Followed by Berente, N., with 3 documents, Cavallo, A., with 3 documents, Ghezzi, A., with 3 documents, Nzembayie, K.F., with 3 documents, Richter, C., with 3 documents, Tumbas, S., with 3 documents and Vom Brocke, J., with 3 documents.

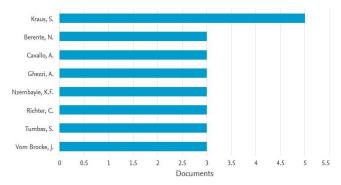


Fig. 3. Documents Number based on Authors of the Digital Entrepreneurship Studies

# D. Documents based on Subject Areas of the Digital Entrepreneurship Studies

The most subject areas in international academic publications in digital entrepreneurship studies were Business, Management, and Accounting with 71 documents (35.7%). Followed by Computer Science with 40 documents (20.1%), Social Sciences with 25 documents (12.6%), Economics, Econometrics and Finance with 20 document (10.1%), Decision Sciences with 12 document (6.0%), Engineering with 10 document (5.0%), Psychology with 9 documents (4.5%), Mathematics with 6 documents (3.0%), Arts and Humanities with 4 documents (2.0%) and Environmental Science with 1 document (0,5%).

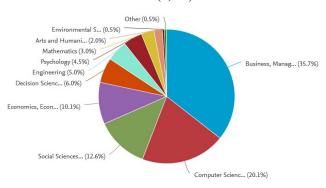


Fig. 4. Number of Documents based on Subject Areas of the Digital Entrepreneurship Studies

### E. Documents based on Types of Digital Entrepreneurship Studies

The most frequent type of document in digital entrepreneurship studies were Conference Article (60.09%) with 69 documents, then Conference Paper (23.5%) with 27 documents, Book Chapter (7.0%) with 8 documents, Editorial (2.6%) with 3 documents, Review (2.6%) with 3 documents, Conference Review (1,7%) with 2 documents, Book (0,9%) with 1 document, letter (0,9%) with 1 document and note (0,9%) with 1 document.

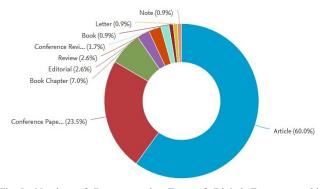


Fig. 5. Number of Documents by Type of Digital Entrepreneurship Studies

# F. Document-based on Sponsoring Funding of the Digital Entrepreneurship Studies

The top sponsoring institutions that assist in the publication of digital entrepreneurship studies were the National Natural Science Foundation of China with 3 documents, the Australian Research Council with 2 documents, and the Marianne and Marcus Wallenberg Foundation with 2 documents.

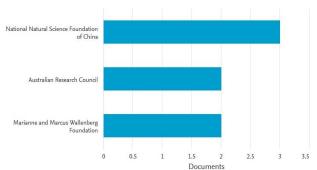


Fig. 6. Number of Documents based on Sponsoring Funding of the Digital Entrepreneurship Studies

### G. Annual documents from the Digital Entrepreneurship Studies

Publications on digital entrepreneurship studies at the global level have been started since 1993. The number of international publications on digital entrepreneurship studies has shown an increasing trend every year. This was can be seen in Fig. 7, the highest publication peak occurred in 2019 with 52 documents.

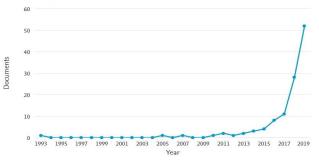


Fig. 7. Number of Documents Per Year from the Digital Entrepreneurship Studies

#### H. Map of Study Theme

The construction on the digital entreprenurship keyword network for the theme map study was built through VOSViewer application. The criterion for a minimum number of documents related to keywords is three repetitions. Therefore, from 605 keywords there were only 41 keywords that meet the thresholds.

Fig. 8. shows that there were six groups of study themes based on research keywords related to digital entreprenurship study, abbreviated as IDEBBES themes.

- 1. Innovation cluster (light blue). In this cluster, we can find innovation themes. This cluster was related by the keywords innovation, digital innovation, entrepreneur and technological forecasting.
- 2. Digitalization cluster (red). This cluster dominated by the keywords digitalization, digital platforms, digital technologies, entrepreneurial activity, information use and information systems.
- 3. Entrepreneurship cluster (green). In this cluster, we can find entrepreneurship themes. This cluster was related by the keywords entrepreneurship, start-up, internet, ecosystem, and digital economy.
- 4. Business development clusters (blue). This cluster dominated by the keywords business development, start-up, crowd funding, and digital business.
- 5. Business models cluster (yellow) and the big data themes in this cluster were found. This cluster was related by the keywords business models, digitization, lean startup, and big data.
- 6. E-commerce cluster (purple). This cluster dominated by the keywords electronic commerce, e-commerce, entrepreneurial process and effectuation.
- Social media cluster (orange). This cluster dominated by the keywords social media and insider action research.

## I. Document Cited of the Digital Entrepreneurship Studies

The publication of digital entrepreneurship studies with the most citations as an academic impact is the work of Nambisan, S in 2017 entitled "Digital Entrepreneurship: Towards a Digital Technology Perspective of Entrepreneurship" in the journal of "Entrepreneurship: Theory and Practice" with 111 document citations.

### J. Authorship Network

The criteria for the minimum number of documents per author were three documents. Thus, from 260 authors, 8 authors were found who met the thresholds. There was one group of collaboration patterns between researchers in digital entrepreneurship studies as shown in Fig. 9, which is a red cluster consisting of 3 authors namely Brente, N., Vom Brocke, J., and Tumbas, S.

Brent Neiman is Professor of Economics at University of Chicago, United States of America. Jan vom Brocke is professor at the University of Liechtenstein, German. Sanja Tumbas focus on Department of Management Information Systems, University of Georgia, United States of America.

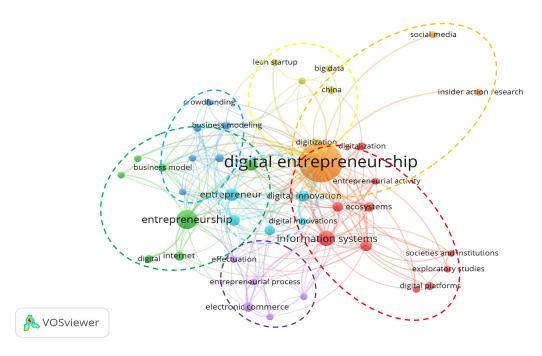


Fig. 8. Map of Study Theme

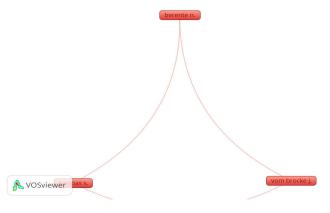


Fig. 9. Authorship Network

#### IV. CONCLUSION

From this study, it can be concluded that the trend on international publications on digital entrepreneurship studies was every years increased in numbers. The culmination of a publication on the digital entrepreneurship Study in 2019 is 52 documents. Digital entrepreneurship studies are still dominated by developed countries, namely the United States with 19 documents. The most productive research institute is Universität Liechtenstein with 6 documents. The most productive author in digital entrepreneurship studies is Kraus, S., with 5 documents, and the most cited document type is Article with 69 documents (60.09%). Meanwhile, the most study area in digital entrepreneurship studies is Business, Management, and Accounting with 71 documents (35.7%). Digital entrepreneurship publication with the highest number of document citations is Nambisan, S.'s 2017 work entitled "Digital Entrepreneurship: Towards a Digital Technology Prespective of Entrepreneurship" with 111 citations. There is one collaboration group namely three writers, each named Brente, N., Vom Brocke, J., and Tumbas, S.

In terms of contributing implications to knowledge, this research proposes a convergence axis classification consisting of digital entrepreneurship studies to characterize the body of knowledge generated from three decades of studies: Innovation, Digitalization, Entrepreneurship, Business development, Business models, E-commerce, and Social media, abbreviated as IDEBBES themes. As implications for practical, identifying key themes in the digital entrepreneurship sector leads to understanding the development of studies to understand common topics and contexts, as well as the research gaps. With all of this, new studies can be led to address a lack of study and advance knowledge in the areas. The themes most researched also demonstrate the digital entrepreneurship contribution to entrepreneuship, business and management.

Future research hopefully is giving contributions and explanation the impact of research by measuring citations based on a combination of data obtained from Scopus and Web of Science.

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