



**Quantitative Research in Economics  
and Management Sciences**

**Edited by**

**Anna Ujwary-Gil**

**Agnieszka Zakrzewska-Bielawska**

**Anna M. Lis**

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**Volume 18 Issue 2**

**2022**

**The JOURNAL OF ENTREPRENEURSHIP, MANAGEMENT AND INNOVATION**

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'Cognitione' Foundation for the Dissemination of Knowledge and Science; os. Bohaterów Tobruku 5, 34-400 Nowy Targ, Poland; [www.fundacjaognione.org](http://www.fundacjaognione.org); e-mail: [fundacja@cognitione.org](mailto:fundacja@cognitione.org); KRS: 0000587704. Journal website: [www.jemi.edu.pl](http://www.jemi.edu.pl)

### **JEMI IS INDEXED AND ABSTRACTED IN**

SCOPUS; WEB OF SCIENCE; ANVUR; ERIH PLUS; CEON; GALE Science in Context: Academic OneFile, Business&Company Profiles, Business and Economics Theory, General Business File ASAP, GREENR, Infotrac Custom Journals, International Business; Cabell's Directories; Directory of Open Access Journals (DOAJ); EBSCO; Google Scholar; Index Copernicus; CEJSH; NLU-Library; Ulrichsweb; WorldCat; SSRN; ARIANTA; Electronic Journals Library; E-journals.org, BazEkon; WSB-NLU Institutional Repository.

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**The original version:** Online first

**ISSN 2299-7075 (PRINT) | ISSN 2299-7326 (ONLINE)**

**ISBN 978-83-959006-8-6 (ONLINE)**

**Cover:** Joanna Długosz

**Typesetting and printed by:**

Wydawnictwo i Drukarnia NOVA SANDEC



ul. Lwowska 143, 33-300 Nowy Sącz, [www.novasandec.pl](http://www.novasandec.pl)

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# Use of structural equation modeling in quantitative research in the field of management and economics: A bibliometric analysis in the systematic literature review

**Agnieszka Zakrzewska-Bielawska<sup>1</sup>**   
**Anna M. Lis<sup>2</sup>** , **Anna Ujwary-Gil<sup>3</sup>** 

## Abstract

**PURPOSE:** This paper aims to provide a comprehensive review of scholarly research focusing on using quantitative methods and particularly structural equation modeling (SEM) in management and economics studies, as well as provide a bibliometric agenda including the time horizon of individual publications, the highest citation rate, geographic and industry areas, methodological context, and keywords.

**METHODOLOGY:** A systematic literature review (SLR) was undertaken using the Web of Science and Scopus databases. We limited our search to the last five years to identify the newest research publications, and we used keywords related to quantitative research while excluding qualitative research. Then we analyzed papers related to SEM and those published in English. **FINDINGS:** Our results confirmed that quantitative methods are used both in management and economics research, and showed a growing trend in the number of publications in the last five years. However, there are many more publications on management than on economics as well as there are more papers published in the Scopus database than Web of Science. Taking into account structural equation modeling, this method is used primarily in

1 Agnieszka Zakrzewska-Bielawska, Full Professor, Dean of the Faculty of Organization and Management; Head of Discipline in Management and Quality Studies; Head of Institute of Management, Lodz University of Technology, Piotrkowska 266, 90-924 Łódź, Poland, e-mail: [agnieszka.zakrzewska-bielawska@p.lodz.pl](mailto:agnieszka.zakrzewska-bielawska@p.lodz.pl) (ORCID: <https://orcid.org/0000-0001-8182-3591>).

2 Anna M. Lis, Ph.D. Hab., Professor of Gdańsk University of Technology, Faculty of Management and Economics, G. Narutowicza 11/12, 80-233 Gdańsk, Poland, e-mail: [Anna.Lis@zie.pg.gda.pl](mailto:Anna.Lis@zie.pg.gda.pl) (ORCID: <https://orcid.org/0000-0002-1527-7796>).

3 Anna Ujwary-Gil, Ph.D., Hab. Professor of Institute of Economics, Polish Academy of Sciences, Laboratory of Process and Network Analysis, Nowy Swiat 72, 00-330 Warsaw, Poland, e-mail: [ujwary@inepan.waw.pl](mailto:ujwary@inepan.waw.pl) (ORCID: <https://orcid.org/0000-0002-5114-7366>).

Received 20 April 2022; Revised 30 May 2022; Accepted 2 June 2022.

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management research. In terms of industry, publications using SEM considered both single- and multi-industry including, first, all Asian countries and then African ones. Publications, especially in the management field, are descriptive in nature and based on primary data collected using a survey questionnaire. Papers are published in various journals and the most cited are those published in journals with wider subject areas.

**IMPLICATIONS:** The systematic literature review is a fundamental necessity in any field of knowledge, benefiting both academia and learners. Our results may be useful for future researchers planning research using quantitative methods, especially SEM, in the business or economic field, by indicating the most cited papers and journals as well as industry and country areas. **ORIGINALITY AND VALUE:** This paper represents a systematic attempt to link quantitative methods, with a particular emphasis on SEM, with research interests on managerial and economic subjects and papers published in the Web of Science and Scopus databases. Employing the bibliometric analysis within the systematic literature review, the paper shows interest and the current state of research using quantitative methods which proves its value and originality.

**Keywords:** quantitative methods, structural equation modeling, systematic literature review, management, economics, citation analysis, geographic area, industry, Web of Science, Scopus.

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## INTRODUCTION

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Each discipline of science has its own research methods. In social sciences, including management and economics, the methodology is highly diverse which makes it pluralist and eclectic (Dow, 2012). There are methods of interpretative (qualitative) research (Mohajan, 2018; Liamputtong, 2020) and methods of testing hypotheses, i.e., quantitative research (Mouhammed, 2015; Stockemer, 2019), using both deduction and induction logic (empiricism) (Stadler, 2004; Evans & Over, 2013), nomothetical and idiographic approaches (Czakov, 2015; DeFreese & Nissley, 2020). This makes the choice of research approach difficult, and scholars more and more often use mixed research in which there is integration and complementary synergy of qualitative and quantitative methods (Molina-Azorin, 2016). However, it should be strongly emphasized that the choice of research method is always secondary to the formulated research problem. In other words, the research question or hypotheses determine the research approach and methods (Molina-Azorin, 2016; Rinjit, 2020).

However, in the social sciences, especially in management and economics, the dominant research framework is still a quantitative methodology (Baškarada & Koronios, 2018). Quantitative research is concerned with the planning, design, and implementation of methods to collect and analyze data (Wilson, 2019). It refers to a set of techniques and tools used to gather a range of numeric data, which could be intrinsically quantitative or imposed

using different scales (Nardi, 2018; Rinjit, 2020). The collection of quantitative data allows researchers to conduct simple to extremely sophisticated statistical analyses. One of them is structural equation modeling (SEM) which is developing all the time. SEM is also called covariance structure modeling (Tarling, 2009), analysis of covariance structures (Blunch, 2008), or causal modeling (Keith, 2006). It uses advanced statistical procedures and techniques (Green, 2016), which allows the determination of the cause-and-effect link between independent and dependent variables and their graphical presentation (Bowen & Guo, 2011). A key advantage of SEM is examining latent unobserved variables as well as observed variables, combining path and factor analytic techniques in the one predictive model (Keith, 2006).

The procedure of structural equation modeling is made up of two stages (Hair et al., 2010). The first one covers building, based on a literature review, a conceptual model, defining individual constructs, development of measurement tools and carrying out studies, as well as the specification and assessment of the measurement model. In this stage, exploratory and confirmatory factor analyses, as well as estimation of the theoretical validity and reliability of scales are usually employed. The second stage covers the specification and assessment of the structural model to allow research conclusions to be drawn (Zakrzewska-Bielawska, 2021). For this purpose, a path model of relationship between latent variables is built and next its fit is checked, using various coefficients. The most popular include Chi-square statistics, Goodness of Fit Index (GFI), Comparative fit index (CFI), and Root Mean Square Error of Approximation (RMSEA). Satisfactory fit values allow estimating the path parameters and testing hypotheses (Mueller & Hancock, 2019; Xia & Yang, 2019).

The possibility of explaining the causality and influence between various unobservable multivariate variables means the interest in SEM is still growing. It has been especially evident in management and economics studies in recent years (e.g., Staniec, 2018; Zhang, Dawson, & Kline, 2021; Zakrzewska-Bielawska, 2021). Despite the growing number of papers in which researchers have applied SEM to solve managerial or economic problems, there is still a need for studies synthesizing and recognizing various aspects of using SEM in the business field. Hence, the research gap has emerged. We have attempted to fill it and our study aims to provide a comprehensive review of scholarly research in management and economics focusing on quantitative methods, especially on SEM, relating to some bibliometric standards. We put the research question such: What is the scope of quantitative methods application, especially SEM, in research in the field of management and economics? To answer it we used the systemic literature review focusing on bibliometric analysis including time, most cited studies and journals as well

as geographic and industry areas, methodological context, and keywords as basic parameters of publications analysis. Our databases were Web of Science and Scopus.

The outline of the paper is as follows. In the first part, we explain the research method. Next, we present and discuss the results of our analyses relating to quantitative methods in management and economics publications and then those using SEM. Finally, the conclusions with limitations and further research directions are included.

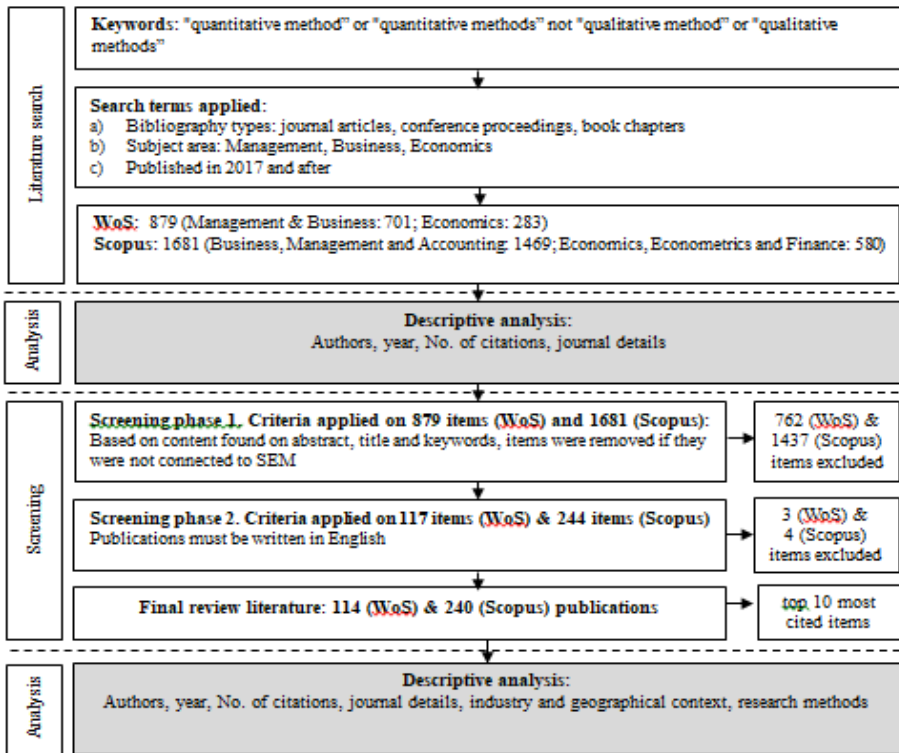
## RESEARCH METHOD

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The Systematic Literature Review (SLR) procedure used in our paper was based on the steps proposed by Tranfield et al. (2003). According to them, SRL should be carried out in three stages: planning the review, conducting the review, and reporting. At the beginning, we conducted a scoping study on using quantitative methods in economics and management sciences, looking for an adequate review of the literature within this area, limited to the last five years. This limitation was due to our willingness to establish the latest trends understood as interests and tendencies in research. We entered aligned keywords into the databases, which helped to establish the state of the art in the topic area under review to date. We also drafted a review protocol to guide the review process (Figure 1).

The second stage – conducting the review – consisted of two sub-stages: literature research and screening, followed by analysis of the results obtained. The literature search was conducted on two databases: Web of Science (WoS) and Scopus on April 09, 2022. We chose these two databases because of their popularity – they contain the relatively largest number of global publications.

For the initial publication selection, we used keywords related to quantitative research, while excluding qualitative research. Then, we applied other search terms focused only on articles, conference proceedings and book chapters, published in the last five years with an additional year 2022 (so the period 2017-2022), in economics and management sciences (in WoS three categories were considered: Management, Business, and Economics, while Scopus considered two categories: Business, Management and Accounting and Economics, Econometrics and Finance). Thus, the literature search identified 879 records in the WoS database and 1681 records in the Scopus database. At this stage, we conducted a first analysis of quantitative research publications, focusing on the 10 highest cited papers (limited to author, year, number of citations, and journal data).



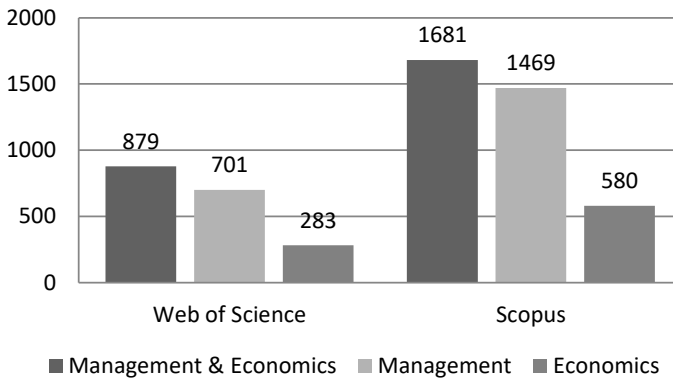
**Figure 1.** The systematic literature review process

Then, the above publications, as they met all the inclusion criteria specified in the review protocol, were qualified for the next phase of the review (screening), in accordance with the recommendation of Tranfield et al (2003). The inclusion process consisted of two screening phases. The first phase consisted of reading the abstracts, titles, and keywords connected to the bibliographic data and removing publications not related to structural equation modeling. This excluded 762 bibliographic items from the WoS database and 1437 items from the Scopus database. In the second screening phase, publications from Web of Science were taken into consideration, limiting them only to those published in English. Thus, seven bibliography items were excluded at this stage. Finally, 354 publications were qualified for the final review literature: 114 in the WoS and more than twice as many (240) in Scopus. Our reports were based on descriptive analyses of the highest-cited 10 papers (combined for WoS and Scopus), which examined a set of categories (such as authors, year, number of citations, journal data, and industry and geographic context, and keywords).

## RESULTS

### Quantitative methods in management and economics publications

The literature search yielded that the Scopus database contains more than twice as many works in both the categories discussed (i.e., management and economics) than the WoS database. The analysis also revealed a significant quantitative advantage of management papers compared to economics (Figure 2). In both databases, there were 2.5 times as many papers published in management as in economics (with some articles included in both categories together).



**Figure 2.** Number of identified publications on quantitative methods (2017-2022).

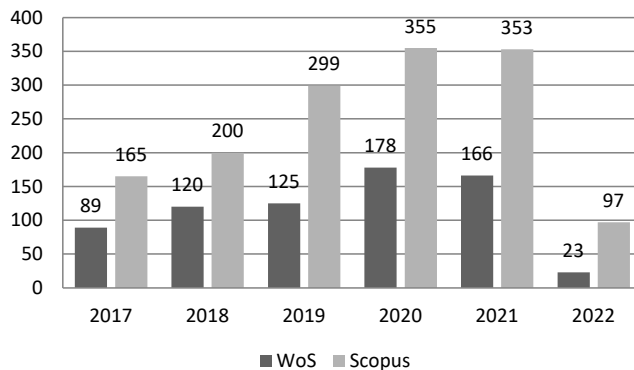
In particular, looking at the broader time context (post-1980), it is clear that the number of papers on quantitative research in management and economics has steadily increased. Between 1981 and 2022, 1814 papers on this topic were found in the WoS database, compared to 3020 in Scopus. In both databases, the distribution of publications by decade looks very similar: the first decade (1981-1990) produced 1% of all papers found, the second decade (1991-2000) - 3%, the third decade (2001-2010) - 19% (WoS) and 14% (Scopus), the fourth decade (2011-2020) - 70% (WoS) and 66% (Scopus), and finally, the last two years (2021-2022) created 12% (WoS) and 20% (Scopus).

It is interesting to relate these data to the trend observed in the increase in the number of papers based on quantitative research, without classifying them into any scientific category. Nearly 24,000 papers were identified in the WoS database, considering only scholarly articles, conference proceedings, and chapters in books. From the beginning of the 20th century until 1963,

several papers were published each year for more than half a century. In the period 1964-1990 (so less than thirty years) the numbers of these publications each year are in double digits (from 15 to 45 papers), while in the period 1991-2012 (almost 20 years) they are already in triple digits (from 153 to 940). And finally, between 2013 and 2021 (so just 8 years), over 1000 papers were published each year. It is worth noting that nearly twice as many papers were published in 2021 as in 2013 (1920 to 1056). The same trends were evident in the Scopus database, which registered more than 32,600 papers. Up until 1946, a few papers were found each year. Between 1947 and 1973, the number of papers published each year was in double digits (from 21 to 82); between 1974 and 2010, it was in triple digits (from 144 to 878); and after 2011, it was in four digits. The number of papers published in 2011 was 1027, while in 2021 - already 2662, which is almost 2.6 times more.

In the area of management, 701 quantitative method papers were identified in the WoS database, while 1469 papers were identified in the Scopus database. The number of papers in the period 2017-2021 shows an increasing trend (Figure 3). There were 89 publications in the WoS database in 2017, while the number doubled to 178 and 166 in 2020 and 2022, respectively. Similar proportions occurred in the Scopus database, with the number of papers from 2020 and 2021 (355 and 353) more than doubling compared to 2017.

In both databases, most of the identified publications are articles (about 76.7% in the WoS database and 83% in the Scopus database), while the remaining records are proceedings papers and book chapters. Almost all the publications found were in English – with the exception of 22 publications in the WoS database and 23 publications in the Scopus database (mainly in Spanish and Portuguese).



**Figure 3.** Number of publications on quantitative methods (Management, 2017-2022).

As a result of the analysis, the 10 most cited articles were also selected using the Google Scholar (GS) database (Table 1). It was decided to add this database as well, since it is commonly used and it contains publications not indexed in WoS and Scopus databases. The most cited paper was found to be “The Importance of Consumer Trust for the Emergence of a Market for Green Products: The Case of Organic Food” (Nuttavuthisit & Thogersen, 2017) (citation count: 455 in GS, 220 in WoS, 265 in Scopus). This publication ranked third in the WoS and the Scopus databases, just after two review publications: “Review of quantitative methods for supply chain resilience analysis” (Hosseini et al., 2019) (citation count: 426 in GS, 252 in WoS, 293 in Scopus) and “Literature review on disruption recovery in the supply chain” (Ivanov et al., 2017) (citation count: 384 in GS, 245 in WoS, 275 in Scopus).

**Table 1.** Measurements of publications citations (Management)

Author/s	Title	Venue of publication	GS	WoS	Scopus
(Nuttavuthisit & Thogersen, 2017)	The importance of consumer trust for the emergence of a market for green products: The case of organic food	Journal of Business Ethics	455	220	265
(Hosseini et al., 2019)	Review of quantitative methods for supply chain resilience analysis	Transportation Research Part E: Logistics and Transportation Review	426	252	293
(Ivanov et al., 2017)	Literature review on disruption recovery in the supply chain	International Journal of Production Research	384	245	275
(Zaid et al., 2018)	The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study	Journal of Cleaner Production	267	148	170
(Bruning & Campion, 2018)	A role-resource approach-avoidance model of job crafting: a multimethod integration and extension of job crafting theory	Academy of Management Journal	222	103	112
(Tu, 2018)	An exploratory study of Internet of Things (iot) adoption intention in logistics and supply chain management: A mixed research approach	International Journal of Logistics Management	190	72	109

Author/s	Title	Venue of publication	GS	WoS	Scopus
(Anggadwita et al., 2017)	Socio-cultural environments and emerging economy entrepreneurship: Women entrepreneurs in Indonesia	Journal of Entrepreneurship in Emerging Economies	170	66	95
(Wilkesmann & Wilkesmann, 2018)	Industry 4.0-organizing routines or innovations?	Vine Journal of Information and Knowledge Management Systems	163	68	78
(Li et al., 2018)	A novel approach to leveraging social media for rapid flood mapping: a case study of the 2015 South Carolina floods	Cartography and Geographic Information Science	159	94	109
(Etter et al., 2018)	Measuring organizational legitimacy in social media: Assessing citizens' judgments with sentiment analysis	Business and Society	156	89	92

**Note:** Citation details were retrieved on Apr. 09, 2022.

We also identified the journals with the highest number of papers using quantitative research, with an assigned h-index in Scientific Journal Rankings (SJR) in the analyzed period of time (Table 2). We selected the 10 highest ranked journals from each of the selected databases. All are categorized as business, management and accounting and only four are assigned to economics, econometrics and finance. *The Journal of Cleaner Production* ranked highest (h-index at 200), with 40 papers on quantitative methods identified. *Journal of Construction Engineering and Management* with a slightly lower h-index (114) contains 21 papers on the analyzed issues. Both journals are indexed in the Scopus database and represent – in addition to business, management and accounting – engineering, and in the case of *The Journal of Cleaner Production* – Energy and Environmental Science. In turn, in the WoS database, the highest ranking journals include: *Journal of Management Development* and *Engineering Construction and Architectural Management* (h-index: 59 and 58, respectively), in which seven papers each related to quantitative methods were identified. Both represent business, management and accounting, plus arts and humanities (*Journal of Management Development*) and Engineering (*Engineering Construction and Architectural Management*).



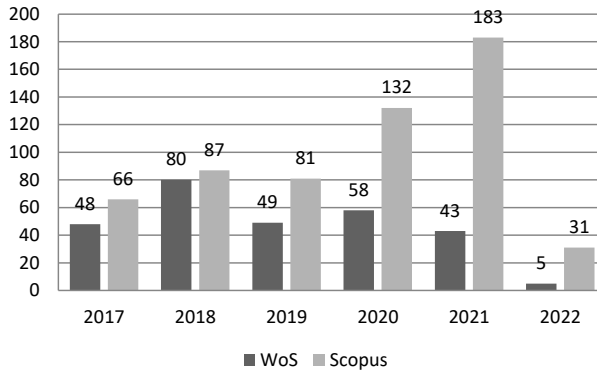
**Table 2.** Measurements of journals (Management)

Journal name	h-index in SJR*	No of articles		Journal subject area
		WoS	Scopus	
Journal of Cleaner Production	200	-	40	Business, Management and Accounting Energy Engineering Environmental Science
Journal of Construction Engineering and Management	114	-	21	Business, Management and Accounting Engineering
Journal of Management Development	59	7	-	Arts and Humanities Business, Management and Accounting
Engineering Construction and Architectural Management	58	7	-	Business, Management and Accounting Engineering
Journal of Portfolio Management	50	-	19	Business, Management and Accounting Economics, Econometrics and Finance
Journal of Islamic Marketing	39	9	-	Business, Management and Accounting
International Journal of Organizational Analysis	25	8	-	Business, Management and Accounting
Entrepreneurship and Sustainability Issues	25	7	-	Business, Management and Accounting Economics, Econometrics and Finance Environmental Science
Quality-Access to Success	21	8	-	Business, Management and Accounting
Polish Journal of Management Studies	21	9	-	Business, Management and Accounting
International Journal of Recent Technology and Engineering	20	-	25	Business, Management and Accounting Engineering
International Journal of Scientific and Technology Research	18	-	35	Business, Management and Accounting Engineering Social Sciences
Management Science Letters	17	-	23	Business, Management and Accounting
International Journal of Supply Chain Management	17	-	26	Business, Management and Accounting Computer Science Decision Sciences

Journal name	h-index in SJR*	No of articles		Journal subject area
		WoS	Scopus	
Academy of Strategic Management Journal	17		12	Business, Management and Accounting
Cogent Business & Management	16	8	-	Business, Management and Accounting Decision Sciences
International Journal of Business and Society	15	7	-	Business, Management and Accounting Economics, Econometrics and Finance
Journal of Asian Finance Economics and Business	14	52	35	Business, Management and Accounting Economics, Econometrics and Finance
African Journal of Hospitality Tourism and Leisure	11	-	17	Business, Management and Accounting Social Sciences

**Note:** \*Data retrieved from SJR on Apr. 09 2022.

In the area of economics, 283 and 530 papers related to the topic of quantitative methods were found in the analyzed databases. In the case of WoS, their number in individual years (2017-2021) is quite similar and oscillates between 43-58 publications. In the Scopus database, an upward trend is visible, with a very large increase in papers in 2021 (183) (Figure 3).



**Figure 3.** Number of publications on quantitative methods (Economics, 2017-2022).

In the WoS database, it is noteworthy that the share of proceedings papers is very high (42%), and only slightly more than half of the papers are articles (57%). In the case of Scopus, the majority of papers (91%) are articles, while conference proceedings have only a 2% share. The vast majority of publications in both databases are in English, with the exception of 18 publications in WoS and 24 in Scopus (publications in Russian and Spanish, among others). Next, we employed the same procedure and selected 10 of the most cited papers (Table 3). The publication “The importance of consumer trust...” (Nuttavuthisit & Thogersen, 2017) ranked first, the most cited also in the area of management. The following publications were ranked next: “Evaluating the causes of cost reduction in photovoltaic modules” (Kavlak et al., 2018) (citation count: 260 in GS, 119 in WoS, 147 in Scopus) and “Socio-cultural environments and emerging economy entrepreneurship: Women entrepreneurs in Indonesia” (Anggadwita et al., 2017) (citation count: 170 in GS, 66 in WoS, 95 in Scopus).

**Table 3.** Measurements of publications citations (Economics)

Author/s	Title	Venue of publication	GS	WoS	Scopus
(Nuttavuthisit & Thogersen, 2017)	The importance of consumer trust for the emergence of a market for green products: The case of organic food	Journal of Business Ethics	455	220	265
(Kavlak et al., 2018)	Evaluating the causes of cost reduction in photovoltaic modules	Energy Policy	260	119	147
(Anggadwita et al., 2017)	Socio-cultural environments and emerging economy entrepreneurship women entrepreneurs in Indonesia	Journal of Entrepreneurship in Emerging Economies	170	66	95
(Duran Sanchez et al., 2017)	Bibliometric analysis of publications on wine tourism in the databases Scopus and WoS	European Research on Management and Business Economics	141	85	94
(Sánchez et al., 2017)	Bibliometric analysis of publications on wine tourism in the databases Scopus and WoS	European Research on Management and Business Economics	141	88	92

Author/s	Title	Venue of publication	GS	WoS	Scopus
(Prochniak & Wasiak, 2017)	The impact of the financial system on economic growth in the context of the global crisis: Empirical evidence for the EU and OECD countries	Empirica	119	29	32
(Salonen, 2018)	Passenger's subjective traffic safety, in-vehicle security and emergency management in the driverless shuttle bus in Finland	Transport Policy	113	62	79
(Martín Gómez et al., 2018)	Smart eco-industrial parks: A circular economy implementation based on industrial metabolism	Resources, Conservation and Recycling	93	48	59
(Khan et al., 2019)	Exploitative and exploratory innovations in emerging economies: The role of realized absorptive capacity and learning intent	International Business Review	81	52	59
(Adnan et al., 2017)	Examining the role of consumer lifestyles on ecological behavior among young Indian consumers	Young Consumers	64	34	38

**Note:** Citation details were retrieved on Apr. 09, 2022.

Similarly, we used the same procedure to identify the most cited journals with the highest number of papers relating to quantitative research. The 10 most highly ranked journals were identified in both databases. The highest-ranking journals (SJR) were found in WoS: *Energy Policy*, *World Development*, *Forest Policy and Economics* (h-index: 217, 175 and 68 respectively), assigned to different areas (Table 4). Each of them published six papers related to quantitative methods. In the Scopus database, the highest ranked journals in the analyzed issues include *Environment Development and Sustainability* and *Journal of Portfolio Management* (h-index at 56 and 50). On the other hand, the highest number of publications related to quantitative methods was identified in the *Journal of Asian Finance Economics and Business* (35).

To sum up, quantitative methods are used both in management and economics but in management are much more popular. An upward trend could be noticed in both fields of analysis, especially in the Scopus database. The most cited papers are those of a review nature published in journals with wider subject areas.

**Table 4.** Measurements of journals (Economics)

Journal name	h-index in SJR*	No of articles		Journal subject area
		WoS	Scopus	
Energy Policy	217	6	-	Energy Environmental Science
World Development	175	6	6	Economics, Econometrics and Finance Social Sciences
Forest Policy and Economics	68	6	-	Agricultural and Biological Sciences Economics, Econometrics and Finance Environmental Science Social Sciences
Environment Development and Sustainability	56	-	8	Economics, Econometrics and Finance Environmental Science Social Sciences
Journal of Portfolio Management	50	-	19	Business, Management and Accounting Economics, Econometrics and Finance
Technological and Economic Development of Economy	47	3	-	Economics, Econometrics and Finance
International Journal of Emerging Markets	30	4	-	Business, Management and Accounting
Economic Research-Ekonomska Istrazivanja	27	3	-	Economics, Econometrics and Finance
International Journal of Business and Society	15	-	7	Business, Management and Accounting Economics, Econometrics and Finance
Journal of Asian Finance Economics and Business	14	-	35	Business, Management and Accounting Economics, Econometrics and Finance
International Journal of Entrepreneurship	12	-	8	Business, Management and Accounting Economics, Econometrics and Finance
Academy of Entrepreneurship Journal	12	-	8	Business, Management and Accounting Economics, Econometrics and Finance
Economies	11	3	-	Economics, Econometrics and Finance Social Sciences
Journal of Social Sciences Research	10	-	8	Arts and Humanities Economics, Econometrics and Finance Social Sciences
Risks	10	-	7	Business, Management and Accounting Economics, Econometrics and Finance
Estudios De Economia Aplicada	6	3	-	Economics, Econometrics and Finance
Studies in Business and Economics	3	4	-	Business, Management and Accounting Economics, Econometrics and Finance Psychology
Eurasian Studies in Business and Economics	unavailable	3	-	unavailable
Pertanika Journal of Social Sciences and Humanities	unavailable	-	13	unavailable

**Note:** \* Data retrieved from SJR on Apr. 09 2022.

## Structural equation modeling in management and economics publications

At the second stage – screening – in the collection of publications related to quantitative methods, only those in which structural equation modeling was used were selected. In the WoS database, we identified 117 such papers (including 106 in the area of management and only 11 in the area of economics). The Scopus database found more than twice as many publications on this topic – a total of 244 (including 189 representing management and 55 in economics). From this pool, we excluded seven more papers not published in English. It turned out that in both databases, the percentage of SEM-related publications represents only 15% of the total quantitative methods papers identified earlier. However, WoS and Scopus data show a clearly increasing trend in the use of structural equation modeling. Interestingly – in both databases it is quite similar: the number of papers published in 2017 and 2018 represent only 8% and 11% of all identified SEM-based papers, while in the following two years (2019 and 2020) the percentage of publications is 15% and 21%, respectively. The most number of papers using SEM were published in 2021 – approximately 30% of all papers found. Considering an even broader temporal context, it is worth noting that the first publications on SEM were published only after 1990 (this applies to management and economics). During the period 1991-2022, a total of 139 papers using SEM were found in the WoS database, while 361 papers were found in Scopus. The first paper indexed in Scopus database was published in 1998, in WoS database – only in 2005. In the period 2001-2010, about 3-4% of all found papers were created (according to WoS and Scopus), but in the period 2011-2020 – already 64% (in both databases this is the same share). In the last two years (2021-2022) – the share of papers about SEM is as high as 33% (WoS & Scopus) in the collection of all found from this topic.

Table 5 shows the 10 journals from each database where the most articles using SEM were found. The two highest-ranked journals, i.e., *Journal of Management Development* and *Journal of Islamic Marketing* (h-index: 59 and 39 respectively), published only a few articles indexed in each of the two databases analyzed (three and four indexed in WoS and four and six in Scopus). In turn, the largest number of SEM-related papers was published in the *Journal of Asian Finance Economics and Business* (16 in both databases), which is assigned to business, management and accounting and economics, econometrics and finance. For Scopus, *the International Journal of Supply Chain Management* proved to be also very popular (with a total of 13 articles), as well as *Management Science Letters* and *Uncertain Supply Chain Management* (nine articles each).

**Table 5.** Measurements of journals (SEM, Management & Economics)

Journal name	h-index in SJR*	No of articles		Journal subject area
		WoS	Scopus	
Journal of Management Development	59	3	4	Arts and Humanities Business, Management and Accounting
Journal of Islamic Marketing	39	4	6	Business, Management and Accounting
Polish Journal of Management Studies	21	1	6	Business, Management and Accounting
International Journal of Recent Technology and Engineering	20	0	6	Business, Management and Accounting Engineering
International Journal of Supply Chain Management	17	0	13	Business, Management and Accounting Computer Science Decision Sciences
Management Science Letters	17	0	9	Business, Management and Accounting
Cogent Business & Management	16	3	5	Business, Management and Accounting Decision Sciences
Uncertain Supply Chain Management	16	0	9	Business, Management and Accounting Decision Sciences
International Journal of Business and Society	15	3	3	Business, Management and Accounting Economics, Econometrics and Finance
Journal of Entrepreneurship in Emerging Economies	15	3	4	Business, Management and Accounting Economics, Econometrics and Finance
Journal of Asian Finance Economics and Business	14	16	16	Business, Management and Accounting Economics, Econometrics and Finance

**Note:** \* Data retrieved from SJR on Apr. 09 2022.

Analysis of publications attributed to management, using previous procedures, identified the 10 most cited papers (taking both WoS and Scopus databases together) (Table 6). The top three included those publications that were also on the list of most cited papers for quantitative methods: “The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study” (Zaid et al., 2018), “An exploratory study of Internet of Things (IoT) adoption intention in logistics and supply chain management: A mixed research approach” (Tu, 2018), and “Socio-cultural environments and emerging economy entrepreneurship: Women entrepreneurs in Indonesia” (Anggadwita et al., 2017). The citation rate of these papers oscillated between 170-281 (GS), 66-147 (WoS), and 96-173 (Scopus).

**Table 6.** Measurements of publications citations (SEM, Management)

Author/s	Title	Venue of publication	GS	WoS	Scopus
(Zaid et al., 2018)	The impact of green human resource management and green supply chain management practices on sustainable performance: An empirical study	Journal of Cleaner Production	281	147	173
(Tu, 2018)	An exploratory study of Internet of Things (IoT) adoption intention in logistics and supply chain management: A mixed research approach	International Journal of Logistics Management	190	72	113
(Anggadwita et al., 2017)	Socio-cultural environments and emerging economy entrepreneurship: Women entrepreneurs in Indonesia	Journal of Entrepreneurship in Emerging Economies	170	66	96
(Mahmood et al., 2019)	The influence of transformational leadership on employees' creative process engagement: A multi-level analysis	Management Decision	123	49	62
(Eisingerich et al., 2019)	Hook vs. hope: How to enhance customer engagement through gamification	International Journal of Research in Marketing	105	40	52
(Khan et al., 2019)	Exploitative and exploratory innovations in emerging economies: The role of realized absorptive capacity and learning intent	International Business Review	86	52	60
(Uddin et al., 2019)	Why individual employee engagement matters for team performance? Mediating effects of employee commitment and organizational citizenship behaviour	Team Performance Management	72	29	41
(Agyabeng-Mensah et al., 2020)	Examining the influence of internal green supply chain practices, green human resource management and supply chain environmental cooperation on firm performance	Supply Chain Management - An International Journal	70	34	45
(Shafiee & Es-Haghi, 2017)	Mall image, shopping well-being and mall loyalty	International Journal of Retail & Distribution Management	50	21	26
(Han et al., 2019)	Impact of core-product and service-encounter quality, attitude, image, trust and love on repurchase: Full-service vs low-cost carriers in South Korea	International Journal of Contemporary Hospitality Management	49	18	25

**Note:** Citation details were retrieved on Apr. 09, 2022.

We further analyzed the extracted publications in the context of the described industry and geographical distribution (Table 7). In terms of industry, the number of publications devoted to single-industry is similar to those describing multi-industry. However, it is worth emphasizing that almost



all papers focus on Asian countries (Bangladesh, Indonesia, Pakistan, and Iran, among others). One publication is about an African country (i.e., Ghana). Moreover, the focus on Asian countries is also clearly visible in more articles. Considering the 20 most cited articles, the majority of them (14 in total) just describe Asian countries (mainly Bangladesh - three articles, Indonesia - three articles, Pakistan - two articles and Vietnam - two articles), and four articles are about African countries (Ghana - two articles, Tunisia and Egypt - one article each). Only one article is about a European country (Spain).

**Table 7.** Industry and geographical context of each review publication (SEM, Management)

Bibliography	Context		Geographical distribution	
(Agyabeng-Mensah et al., 2020)	Multi-industry	Food, beverage and alcohol, textiles, agrochemical and plastics	Single-country	Ghana
(Anggadwita et al., 2017)	Multi-industry	General	Single-country	Indonesia
(Han et al., 2019)	Single-industry	Airlines	Single-country	South Korea
(Mahmood et al., 2019)	Multi-industry	General	Single-country	Bangladesh
(Shafiee & Es-Haghi, 2017)	Single-industry	Mall	Single-country	Iran
(Tu, 2018)	Multi-industry	General	Single-country	Taiwan
(Uddin et al., 2019)	Multi-industry	General	Single-country	Bangladesh
(Eisingerich et al., 2019)	Single-industry	Digital service	Multi-country	General
(Khan et al., 2019)	Single-industry	Automotive	Single-country	Pakistan
(Zaid et al., 2018)	Multi-industry	Food, chemical, and pharmaceutical	Single-country	Palestine

Almost all papers represent a pure quantitative research approach (Table 8). They are primarily descriptive or causal in nature, based on primary data collected through a survey questionnaire. Only two publications are exploratory, presenting mixed models, using additional data collection and analysis methods typical of qualitative research.

**Table 8.** Overview of the research designs, approaches and methods (SEM, Management)

Author/s	Research Approach	Data Source	Data collection method	Methodology
(Agyabeng-Mensah et al., 2020)	Quantitative	Primary	Questionnaire	SEM
(Anggadwita et al., 2017)	Quantitative	Mixed	Documents, questionnaire	SEM
Han et al., 2019)	Quantitative	Primary	Questionnaire	SEM
(Mahmood et al., 2019)	Quantitative	Primary	Questionnaire	SEM
(Shafiee & Es-Haghi, 2017)	Quantitative	Primary	Questionnaire	SEM
(Tu, 2018)	Mixed	Primary	Interviews, questionnaire	Grounded Theory, SEM
(Uddin et al., 2019)	Quantitative	Primary	Questionnaire	SEM
(Eisingerich et al., 2019)	Mixed	Primary	Interviews, questionnaire	Inductive qualitative data analysis
(Khan et al., 2019)	Quantitative	Primary	Questionnaire	SEM
(Zaid et al., 2018)	Quantitative	Primary	Questionnaire	SEM

**Note:** \* Design is not explicitly stated or clearly described in the text.

Papers in the area of economics are published in various journals. The most cited papers turned out to be: “Socio-cultural environments and emerging economy” (Anggadwita et al., 2017) – which is also among the top three most cited articles in the area of management. The second and third most cited articles are: “Exploitative and exploratory innovations in emerging economies: The role of realized absorptive capacity and learning intent” (Khan et al., 2019) (citation count: 86 in GS, 52 in WoS, 60 in Scopus), and “Examining the role of consumer lifestyles on ecological behavior among young Indian consumers” (Adnan et al., 2017) (citation count: 68 in GS, 34 in WoS, 64 in Scopus) (Table 9). However, the citations here are much lower than in management fields.

**Table 9.** Measurements of publications citations (SEM, Economics)

Author/s	Title	Venue of publication	GS	WoS	Scopus
(Anggadwita et al., 2017)	Socio-cultural environments and emerging economy entrepreneurship Women entrepreneurs in Indonesia	Journal of Entrepreneurship in Emerging Economies	170	66	95
(Khan et al., 2019)	Exploitative and exploratory innovations in emerging economies: The role of realized absorptive capacity and learning intent	International Business Review	86	52	60
(Adnan et al., 2017)	Examining the role of consumer lifestyles on ecological behavior among young Indian consumers	Young Consumers	68	34	64
(Jiménez-Barreto & Campo-Martínez, 2018)	Destination website quality, users' attitudes and the willingness to participate in online co-creation experiences	European Journal of Management and Business Economics	50	19	18
(Rani et al., 2018)	Interplay between trust and distrust in the workplace: examining the effect of psychological contract breach on organizational disidentification	Journal of Asia Business Studies	26	16	15
(Mardi et al., 2018)	Sustaining Organizational Performance Through Organizational Ambidexterity by Adapting Social Technology	Journal of the Knowledge Economy	24	10	12
(Wijaya & Suasih, 2020)	The effect of knowledge management on competitive advantage and business performance: A study of silver craft SMEs	Entrepreneurial Business and Economics Review	15	3	6
(Hoa et al., 2020)	Knowledge sharing influence on innovation: A case of textile and Garment enterprises in Vietnam	Journal of Asian Finance Economics and Business	14	12	11
(Srikalimah et al., 2020)	Do creativity and intellectual capital matter for SMEs sustainability? The role of competitive advantage	Journal of Asian Finance, Economics and Business	14	8	9
(Balcerzak & Pietrzak, 2017)	Sustainable development in the European Union in the years 2004-2013	Regional Studies on Economic Growth, Financial Economics and Management	8	8	4

**Note:** Citation details were retrieved on Apr. 09, 2022: \* Google Scholar.

Publications relating to SEM in the field of economics were equally related to single and multi-industry. They are based on single-country, dominated – as in the case of management – by Asian countries (Table 10). Similarly, in this case, almost all of them are based on a quantitative research approach (only two also use other methods, such as Grounded Theory) as presented in Table 11.

**Table 10.** Industry and geographical context of each review publication (SEM, Economics)

Bibliography	Context		Geographical distribution	
(Adnan et al., 2017)	Multi-industry	General	Single-country	India
(Anggadwita et al., 2017)	Multi-industry	General	Single-country	Indonesia
(Hoa et al., 2020)	Single-industry	Textile	Single-country	Vietnam
(Mardi et al., 2018)	Multi-industry	General	Single-country	Indonesia
(Rani et al., 2018)	Single-industry	Health-care	Single-country	Pakistan
(Wijaya & Suasih, 2020)	Single-industry	Silver craft	Single-country	Indonesia
(Jiménez-Barreto & Campo-Martínez, 2018)	Multi-industry	General	Single-country	Spain
(Khan et al., 2019)	Single-industry	Automotive	Single-country	Pakistan
(Srikalimah et al., 2020)	Multi-industry	General	Single-country	Indonesia
(Balcerzak & Pietrzak, 2017)	Multi-industry	General	Multi-country	the European Union countries

**Table 11.** Overview of the research designs, approaches and methods (SEM, Economics)

Author/s	Research Approach	Data Source	Data collection method	Methodology
(Adnan et al., 2017)	Quantitative	Primary	Questionnaire	SEM
(Anggadwita et al., 2017)	Quantitative	Mixed	Documents, questionnaire	SEM
(Hoa et al., 2020)	Quantitative	Primary	Questionnaire	SEM
(Mardi et al., 2018)	Mixed	Primary	Questionnaire	Grounded Theory, SEM
(Rani et al., 2018)	Quantitative	Primary	Questionnaire	SEM
(Wijaya & Suasih, 2020)	Quantitative	Primary	Questionnaire	SEM
(Jiménez-Barreto & Campo-Martínez, 2018)	Mixed	Primary	Questionnaire	Content analysis, SEM
(Khan et al., 2019)	Quantitative	Primary	Questionnaire	SEM
(Srikalimah et al., 2020)	Quantitative	Primary	Questionnaire	SEM
(Balcerzak & Pietrzak, 2017)	Quantitative	Secondary	Documents	SEM

**Note:** \* Design is not explicitly stated or clearly described in the text.

Taking into account keywords in particular papers, we observed quite big diversification. Therefore, based on our results, it was impossible to identify consistent thematic clusters. This applies to both management and economics publications. The most frequent keywords turned out to be: leadership, behavior, information, product, order, sustainability, implementation, loyalty, perception, and involvement. For the 10 papers selected from management and economics, the most frequently addressed issues appeared to be: sustainability and green economy, supply chain management, innovation and knowledge management (including absorptive capacity), leadership, and organizational behavior (Table 12).

**Table 12.** Author keywords (SEM, Management & Economics)

Author/s	Management	Economics	Keywords
(Adnan et al., 2017)		x	Adolescence; Children and brands; Quantitative methods
(Agyabeng-Mensah et al., 2020)	x		Collaboration; Sustainability; Environmental management; Surveys; Structural equation modelling
(Anggadwita et al., 2017)	x	x	Indonesia; Emerging economies; Women entrepreneurship
(Balcerzak & Pietrzak, 2017)		x	European Union; Structural Equation Model (SEM); Sustainable development
(Eisingerich et al., 2019)	x		Gamification; Digital service; Engagement; Hope; Compulsion; Digital sales
(Han et al., 2019)	x		Brand trust
(Hoa et al., 2020)		x	Trust; Management Support; Reward; Teamwork; Knowledge Sharing; Innovation
(Jiménez-Barreto & Campo-Martínez, 2018)		x	Co-creation; Attitude toward the website; Online co-creation experience; Tourism destination website; Website quality
(Khan et al., 2019)	x	x	Potential absorptive capacity; Realized absorptive capacity; Learning intent; Exploratory innovation; Exploitative innovation; Knowledge transfer; Automotive parts industry; Organizational learning; Quantitative methods
(Mahmood et al., 2019)	x		Task complexity; Transformational leadership; Intrinsic motivation; Creative process engagement; Support for innovation
(Mardi et al., 2018)		x	Organizational ambidexterity; Organizational performance; Social technology; Absorptive capacity

Author/s	Management	Economics	Keywords
(Rani et al., 2018)		x	Social identity theory; Organizational behaviour; Research design
(Shafiee & Es-Haghi, 2017)	x		Hedonic value; Utilitarian value; Mall image; Mall loyalty; Shopping well-being
(Srikalimah et al., 2020)		x	Creativity; Intellectual capital; Competitive advantage; SMEs; Sustainability
(Tu, 2018)	x		Internet of Things; RFID; Mixed method; Asia; Logistics and supply chain management; IoT adoption intention; Mixed research approach
(Uddin et al., 2019)	x		Organizational commitment; Positive psychology; Employee engagement; Team performance; Citizenship behaviour
(Wijaya & Suasih, 2020)		x	Business performance; Competitive advantage; Knowledge management; SEM analysis; SMEs
(Zaid et al., 2018)	x		Green human resource management; Green supply chain management; Sustainable performance; Sustainable operations management; Manufacturing sector; Palestine

## DISCUSSION AND CONCLUSION

Quantitative methods are widely used by economists and management specialists who study economic and managerial problems. Their undoubted advantages, such as the possibility of testing and checking as well as repeatability which makes them more reliable, less openness to error and subjectivity thanks to straightforward, objective statistical analysis, and also prestige and technical advancements in the analytical tools used (Stockemer, 2019; Oakshott, 2020), make them popular and eagerly performed by researchers. It is confirmed by our results. Providing a comprehensive review of scholarly research in management and economics focused on quantitative methods, especially on SEM, we identified the scope and some trends of research interest in those fields, thus achieving our goal and answering the research question.

First, we proved a growing trend in a number of publications employing quantitative methods in the last five years. It is particularly marked in the number of publications indexed in the Scopus database and those related to management research. This is probably due to the fact that the field of business

and management has more journals assigned in databases than the economics field, and also more researchers represent the discipline of management.

Second, in quantitative research, a change in applying statistical methods has been observed since the 1990s. There is a move away from simple description and statistical exploration and has moved on to explaining causality and modeling, allowing for causal inference. This approach stimulates the use of structural equation modeling to test hypothetical cause-effect relationships between variables (Hair et al., 2010; Martínez-López, Gázquez-Abad, & Sousa, 2013). Thus, SEM models began to be widely used in management and economics research to identify and estimate the paths of dependencies in often complex phenomena. Hershberger (2003) reports that SEM is the most commonly used multivariate technique and Tarka (2018) states that the increase in the number of publications regarding SEM is currently one of the most discernible analytical strategies in social sciences literature. These trends confirmed our research. The increase in the number of SEM articles is visible both in WoS and Scopus databases as well as in management and economics fields. Green (2016) noticed similar trends indicating that SEM has gained increasing popularity over time with a record amount of publications in recent years, while Staniec (2018) reviewed the publications in the Elsevier database with limitations to the business management and accounting field, indicating 3492 SEM papers at the end of January 2018, of which 517 articles were published before 1998.

Third, our keywords analysis showed that scholars used SEM models for various research problems among which the most frequent keywords included issues of sustainability (Balcerzak & Pietrzak, 2017; Agyabeng-Mensah et al., 2020; Srikalimah et al., 2020; Zaid et al., 2018); supply chain management (Tu, 2018; Zaid et al., 2018), innovation and knowledge management (Hoa et al., 2020; Khan et al., 2019; Mahmood et al., 2019; Mardi et al., 2018; Srikalimah et al., 2020); leadership (Bharadwaj & Deka, 2021; Fauzi et al., 2021; Haque et al., 2020; Mahmood et al., 2019), and organizational behavior (Khalid et al., 2021; Loan et al., 2021; Rani et al., 2018; Uddin et al., 2019). This trend of variety was also observed by other researchers (e.g., Hirschmann & Swoboda, 2017; Staniec, 2018; Zhang, Dawson, & Kline, 2021). The heterogeneity of issues and also keywords according to which we made our analysis made it impossible to distinguish consistent thematic clusters for which SEM models are useful. For the same reason, the most cited papers and journals represent different problems and areas of research.

Fourth, we identified geographic and industry trends of research interest in using SEM in the business field. Most publications consider Asian countries and then African ones. Taking into account industry, both management and economics published papers on single- and multi-industry equally. It means

that SEM is appropriate for different industry contexts, which confirms its universal application indicated by some researchers (Williams, Vandenberg, & Edwards, 2009; Tarka, 2018; Mueller & Hancock, 2019).

Our results could be useful for future researchers planning research using quantitative methods, especially SEM. The most cited papers and journals could be a map pointing out which topics identified on keywords applying structural equation modeling are of the greatest interest and which journals are interested in publishing those kinds of results. Besides the inspiration for future researchers, our paper contributes to the management and economic literature by providing a systematic literature review and discussing bibliometric standards, such as time, most cited studies and journals, as well as geographic, industry, methodological context, and keywords in extracted studies. Thus, we identified trends of research interests focused on quantitative methods with concern on structural equation modeling.

Our study is not free from limitations, which points further directions of research. Firstly, publications were selected from only two databases – WoS and Scopus. Therefore, further research should include other popular databases such as Elsevier, Proquest, Emerald or Ebsco. Secondly, we focused on a descriptive review of previous research without links to SEM theory, which could be the next step for future research. Lastly, we chose only a few criteria for analysis, concentrating on basic bibliometric standards, hence future research could include additional and more sophisticated criteria as well as deep content analysis allowing to determine the state of knowledge about SEM. Overall, we are confident that our study offers an interesting map of quantitative research in the field of management and economics, which will be extended by future research, including those presented in this thematic issue of the *Journal of Entrepreneurship, Management and Innovation*.

...

In this thematic issue of the *Journal of Entrepreneurship, Management and Innovation*, entitled Quantitative Research in Economics and Management Sciences, the authors used many quantitative methods and research models, e.g., SEM, PLS-SEM, or probit models. Each of these approaches is characterized by methodological rigor and an assessment of the reliability and validity of the research instruments used. Pini and Tchorek (2022) analyze the determinants of exports in two European, culturally related countries, such as Italy and Poland, using an econometric and probit model, which implies a normal distribution of errors and is adapted to binary responses (excluding size and age variables). The authors investigate the influence of many independent variables (size, age, management by



family members or external managers) on the dependent variable (export), controlling the research model by product and process innovation, location in a less developed region, operations in a high/medium-high technology-intensive sector or cooperation with many banks. The results confirm the authors' initial assumptions that the size of companies influences the exports of the surveyed countries; the age of companies exporting their goods is more important in Italy than in Poland, where no such impact has been recorded. In addition, management by an external manager increases the likelihood of exports for younger family businesses in Italy and smaller family businesses in Poland. The authors also showed that product innovation is the engine of exports in Italy and Poland, and geographic location affects the likelihood of exports in Italy, but not in Poland.

In other studies, Paulino (2022) presents the growing business analytics and business intelligence in the Philippines, their impact on organizational performance, and on marketing, financial, and business-process performance indicators. Retail companies were selected for the study, focusing on advanced data management used in business operations. The author mainly used the well-known PLS-SEM model, and his research instrument was assessed in terms of content validity, construct validity, and reliability. The results of the measurement and structural model evaluation were also subject to verification. The results indicate the impact of business analytics capabilities (including the ability of the decision support system (DSS), business process improvement (BPM), data dashboard (DD), and financial analysis (FA) on the business intelligence level. In addition, it has been empirically verified that organizational performance influences marketing, financial, and business process performance. Overall, business intelligence is an essential predictor of a retail company's organizational performance. The assumption that the level of readiness to implement business analytics can be treated as a moderating factor between business analytics and organizational performance has not been confirmed.

The next article by Klimontowicz and Majewska (2022) presents the positive impact of intellectual capital (IC), especially its three components, such as process capital, human capital and relational capital, on the competitiveness of banks and market efficiency. The authors used the following methods and tools: Principal Axis Factor Analysis, PLS-SEM, PAPI, and CAWI. As a result of their application, they emphasize that, in contrast to previous research, the process capital dominates the bank's potential to create a competitive advantage, not human capital, proving the vital role of technology and innovation. They found that competitive performance moderates the relationship between IC and market efficiency; the environment positively moderates the relationship between IC and

competitor performance as well as the relationship between competitor performance and market efficiency. The size of the bank and the length of its market activity affect the market efficiency measured by the average rate of changes in ROA and ROE. The study expands the existing evidence, mainly from well-developed countries, on the intellectual capital of Polish banks, emphasizing the process capital to a much greater extent as a modern and, so far, little exposed component of IC in other research.

The last two articles refer to human resource management. Hassan's study (2022) explores the impact of human resource management (HRM) practices on employee retention. In addition, he moderates the role of performance evaluation, training and development in the relationship between HRM practices and employee retention. Using SEM and questionnaires validated by other researchers, the author proves the originality of research in the retail sector in the Maldives on improving employee retention, a complementary approach to the impact of rewards and compensations, training and employee development, as well as assessing their results in human capital management, recommending practical solutions for the sector retail Maldives. In another study on workers' adaptive performance, Tan and Antonio (2022) use PLS-SEM to prove that the new form of remote work and the so-called e-leadership forced by the COVID-19 pandemic has changed the way employers and employees interact. Organizational commitment, teleworking, and a sense of purpose directly affect employees' adaptive performance, while the perception of e-leadership indirectly. It is also one of the first studies to capture intrinsic motivation as the antecedent of employee adaptive performance, along with perceived e-leadership and teleworking results.

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### **Abstrakt**

**CEL:** Celem artykułu jest przeprowadzenie kompleksowego przeglądu literatury z ostatnich pięciu lat aby zidentyfikować główne trendy zainteresowania badaczy zastosowaniem metod ilościowych, w szczególności modelowania równań strukturalnych (SEM). Badania objęto nauki o zarządzaniu i ekonomię. Określono aktywność badawczą ze względu na horyzont czasowy, najwyższy wskaźnik cytowań, kontekst geograficzny, branżowy i metodologiczny oraz słowa kluczowe wybranych do analizy publikacji. **METODYKA:** Badania przeprowadzono przy użyciu metody systematycznego przeglądu literatury (SLR) wykorzystując dwie kluczowe bazy danych, jak Web of Science i Scopus. Analizie poddano wyłącznie opracowania z ostatnich pięciu lat. W celu rozpoznania trendów badawczych wykorzystano słowa kluczowe związane z badaniami ilościowymi, wykluczając jednocześnie badania jakościowe jako kryterium poszukiwań. Następnie przeanalizowano publikacje związane z SEM oraz te opublikowane w języku angielskim. **WYNIKI:** Uzyskane wyniki potwierdziły, że metody ilościowe są wykorzystywane zarówno w badaniach z zakresu zarządzania, jak i ekonomii oraz wykazują trend rosnący w zakresie liczby publikacji w ciągu ostatnich pięciu lat. Jednocześnie publikacji z zakresu zarządzania jest znacznie więcej niż z ekonomii, przy większej ich liczebności w bazie Scopus niż Web of Science. Biorąc pod uwagę modelowanie równań strukturalnych, metoda ta jest stosowana przede wszystkim w badaniach z zakresu zarządzania. W ujęciu branżowym, publikacje wykorzystujące SEM dotyczyły zarówno analiz jedno-, jak i wielobranżowych, obejmując w pierwszej kolejności kraje azjatyckie, a następnie afrykańskie. Z kolei badania z zakresu ekonomii są bardziej jednorodne, obejmując najczęściej jedną branżę lub jeden kraj. Publikacje, zwłaszcza z zakresu zarządzania, mają charakter deskryptywny i bazują na danych pierwotnych zebranych za pomocą kwestionariusza ankiety. Opracowania podlegające analizie zostały opublikowane w różnych czasopismach, jednak najczęściej cytowane są te zamieszczone w czasopismach o szerszym zakresie tematycznym. **IMPLIKACJE:** Systematyczny przegląd literatury jest ważną metodą systematyzacji wiedzy i określania trendów badawczych w każdej dyscyplinie naukowej, inspirując i dostarczając implikacji badawczych. Nasze wyniki, poprzez wskazanie najczęściej cytowanych artykułów i czasopism a także branż i obszarów geograficznych prowadzonych analiz, mogą być przydatne dla przyszłych badaczy planujących badania z wykorzystaniem metod ilościowych, zwłaszcza SEM, w obszarze zarządzania lub ekonomii. **ORYGINALNOŚĆ/WARTOŚĆ:** Artykuł jest próbą powiązania metod ilościowych, ze szczególnym uwzględnieniem SEM, z problematyką nauk o zarządzaniu i ekonomii przy wykorzystaniu publikacji indeksowanych w bazach Web of Science i Scopus. Wykorzystując systematyczny przegląd literatury i analizę cytowań, artykuł ukazuje trendy i aktualny stan badań w zakresie wykorzystania metod ilościowych w literaturze biznesowo-ekonomicznej, wypełniając lukę poznawczą w tym obszarze.

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**Słowa kluczowe:** metody ilościowe, modelowanie równań strukturalnych, SEM, systematyczny przegląd literatury, SLR, zarządzanie, ekonomia, analiza cytowań, obszar geograficzny, przemysł, Web of Science, Scopus

## Biographical notes

**Agnieszka Zakrzewska-Bielawska** is a full professor and head of the Institute of Management, Lodz University of Technology, Poland. Her research interests focus on strategic management and the organization of enterprises. In particular, the main research topics are creating and implementing strategies, especially in the high-tech sector, inter-organizational relations including the strategy of cooperation and co-competition as well as the evolution and changes of organizational structures, and recently the concept of ambidexterity. She is the author or co-author of over 160 scientific publications in Polish and English. She has participated in and managed numerous research projects, including those financed by the National Science Center. She is a member of the Presidium of the Organization and Management Sciences Committee of the Polish Academy of Sciences, and also a member of the Strategic Management Society, Academy of Management, and the Polish Economic Society in Lodz.

**Anna M. Lis** is the Associate Professor at the Gdańsk University of Technology. Her scientific interests have been focused on problems related to institutional forms of support provided for the development of inter-organizational cooperation including cluster organizations and business environment institutions. Her recent research concerns issues related to sustainability, the green economy, and the circular economy. She has participated in many research projects implemented at academic centers, as well as in projects requested by the public authorities.

**Anna Ujwary-Gil** is a professor at the Institute of Economics, Polish Academy of Sciences in Warsaw, Poland. She received her Ph.D. and habilitation in economics and management from the Warsaw School of Economics, Poland. She is founder and president of the Cognitione Foundation for the Dissemination of Knowledge and Science. Her research interests include social (organizational) network analysis, knowledge management, intellectual capital, resource-based views, and dynamic approaches to organization and management. She has published her works in *Library & Information Science Research*, *Electronic Markets*, *Journal of Business and Industrial Marketing*, and *Economics & Sociology*.



## Conflicts of interest

The authors declare no conflict of interest.

## Citation (APA Style)

Zakrzewska-Bielawska, A., Lis, A.M., & Ujwary-Gil, A. (2022). Use of structural equation modeling in quantitative research in the field of management and economics: A bibliometric analysis in the systematic literature review. *Journal of Entrepreneurship, Management and Innovation*, 18(2), 7-40. <https://doi.org/10.7341/20221821>

# Comparative analysis of export determinants in Italian and Polish firms: The moderating role of non-family management

Marco Pini<sup>1</sup> , Grzegorz Tchorek<sup>2</sup> 

## Abstract

**PURPOSE:** The paper analyses the determinants of exporting from a cross-country perspective, comparing Italy and Poland. It focuses on three objectives: i) investigating if age and size influence the firm's probability to export; ii) if there are differences between family and non-family management; iii) if and how non-family management positively moderates the relationship between age, size, and the firm's probability to export. **METHODOLOGY:** Microeconomic analysis using probit regressions on two surveys carried out in Italy and Poland on representative samples of manufacturing SMEs (1,100 for Italy and 680 for Poland). We control for several factors, such as innovation, geographical location, economic sector, and banks relationship. **FINDINGS:** In both countries, the larger firms have a higher probability to export, with a higher significant effect in Italy than in Poland. Business experience proves to be a factor affecting the likelihood of exporting only in Italy (in a positive sense: older firms are more likely to export) and not in Poland. External (non-family) management is a driver for the internationalization of family-owned firms, especially for younger firms in Italy and for smaller firms in Poland. All these findings are confirmed by robustness check analyses on the subsample of family-owned firms. **IMPLICATIONS:** i) the role of corporate governance can differ between countries with reference to a firm's competitiveness; ii) favoring management openness to external managers for family-owned firms; iii) small firms require greater support in encouraging exporting behavior; iv) the need to consider jointly the issues of innovation, internationalization and corporate governance modes (family/non-family management) in the agenda of the firm's competitiveness. **ORIGINALITY AND VALUE:** The paper contributes to the literature on the determinants of exporting by simultaneously studying some firm's

1 Marco Pini, Senior Economist, Centro Studi delle Camere di Commercio Guglielmo Tagliacarne, P.O. Box Piazza Sallustio, 9, 00187, Rome, Italy, e-mail: marco.pini@tagliacarne.it (ORCID: <https://orcid.org/0000-0003-4249-6932>).

2 Grzegorz Tchorek, Assistant Professor, Faculty of Management, University of Warsaw, P.O. Box 1/3 Szturmowa St., 02-678 Warsaw, Poland, e-mail: tchorek@wz.uw.edu.pl (ORCID: <https://orcid.org/0000-0003-0307-7639>).

Received 21 August 2021; Revised 7 December 2021; Accepted 4 January 2022.

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*characteristics related to size and age with others related to corporate governance, which are usually addressed separately. Furthermore, this paper tries to fill a gap concerning a lack of cross-country studies focusing on European countries other than those more advanced.*

**Keywords:** *internationalization, family firms, innovation, SME, export determinants, non-family management*

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## INTRODUCTION

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In the era of globalization, export competitiveness is increasingly important and the literature confirms that there is an *export premium*, seen as higher profitability and resilience, for exporting companies in comparison to non-exporting ones (Meliciani & Tchorek, 2018). Moreover, internationalized companies also usually grow more rapidly – the European Commission (2010) found that exporting European SMEs grow more than twice as fast as those who are non-exporting. So what competitiveness features can increase the internationalization of companies and countries?

While for many decades, the traditional trade theory was based on the companies homogeneity assumption, an important strand of the literature based on the “new” new trade theory pointed out that companies’ features are more important than countries’ or industries’ ones as determinants of exporting (Melitz, 2003). Thus, firm heterogeneity allows for understanding a firm’s decision on whether to enter international markets or not, as well as the magnitude of that participation (e.g., Melitz & Redding, 2014). In this regard, some structural characteristics of the firm can influence the export decision, such as size and age (e.g., Williams, 2011; Wagner, 2015), even if so far the findings still remain controversial. Nevertheless, the most extended literature points out that size positively influences export behavior (e.g., Wagner, 2015; Williams, 2011; Cassetta et al., 2020). As well as concerning the age, many studies highlight that the older firms have a greater ability to export than the younger ones (e.g., Wagner, 2015; Sheard, 2014), also considering the absorptive capacity of the startups (Chaparro et al., 2021). In contrast, the born global literature (Madsen & Servais, 2017; Oviatt & McDougall, 1994) argues that age is not a critical factor of firms’ internationalization, even if it often refers only to high-tech startups in services sectors.

The firm heterogeneity also concerns corporate governance, since family firms behave differently as compared to non-family ones (Chua et al., 1999; Miller et al., 2010), including also the internationalization dimension (for a recent review, Casprini et al., 2020). The newest approach indicates that we should focus not only on differences between family and non-family-owned firms, but also recognize differences between separate modes of family

governance, as the family companies group is also heterogeneous (Hillebrand et al., 2020). In this regard, even more important is the management within the family firm, because the presence of family or non-family members in the management may influence its competitiveness (Hennart et al., 2019; Binacci et al., 2016; Carney, 2005). In the international business literature, the largest strand of the literature indicates that family management might discourage internationalization (Hennart et al., 2019), underlining the positive role of non-family management (Binacci et al., 2016).

The aim of the paper is to combine these two strands of the literature, investigating: first, if age and size influence the firm's probability to export (export propensity); second, if there are differences between family (intended as family-owned firms run by family managers) and non-family management (intended as family-owned firms run by external managers); and, third, if and how non-family management positively moderates the relationship between age and size – always with respect to the firm's probability to export.

In this way, the paper contributes to the literature on the determinants of export propensity by studying simultaneously some firm's characteristics related to size and age with others related to corporate governance, which are usually separately addressed (e.g., Williams, 2011; Wagner, 2015; Casprini et al., 2020; Kontinen & Ojala, 2010; Pukall & Calabrò, 2014). And in so doing, we conduct a cross-country analysis increasing the originality of the study. Integrating two countries' databases in one equivalent database, this paper aims to compare one of the most advanced European Union (EU) countries with recognizable trademarks, namely Italy, to one of the most important emerging European countries – Poland. Although those two countries have different economic development levels and paths, they show several similarities related to the issue of this paper: both countries are strongly export-oriented; they have a high presence of manufacturing; and, on the socioeconomic ground, the family is an important institution that affects social and companies' relations. Nevertheless, it is worth noticing that in Italy the structure is much more concentrated on small companies (up to 50 employees); another difference is the general trend of new companies entering the manufacturing sector – a growing trend in Poland and the opposite in Italy.

We investigate these issues through a microeconomic analysis (probit models and calculating the marginal effects), exploring two surveys carried out in 2015 in Italy and Poland on representative samples, and focusing on manufacturing SMEs: 1,100 for Italy and 680 for Poland. We control for several factors, such as innovation, geographical location, economic sector, and banks relationship. Our results suggest that in both countries the larger firms have a higher probability to export, with a higher significant effect in Italy than in Poland. Regarding instead the age, business experience proves to be a factor

affecting the likelihood of exporting only in Italy (in a positive sense: older firms are more likely to export) and not in Poland. Moreover, the results show that external (non-family) management is a driver for the internationalization of family-owned firms, especially for younger firms in Italy (moderation effect on the younger firms) and for smaller firms (moderation effect on the smaller firms) in Poland. This paper fills a gap recently highlighted by some scholars concerning a lack of cross-country studies focusing on European countries other than those more advanced (Hennart et al., 2019). Moreover, studying SMEs is essential for industrial policies, since the main European initiatives in supporting firms' competitiveness refer to small and medium-sized enterprises (e.g., European Commission, 2013).

The remainder of the paper is organized as follows: The following section presents the literature recalled in the order corresponding to different internationalization factors and develops the hypotheses. Then, methodology and methods are described, as well as results and discussion. The paper ends with the conclusion.

## LITERATURE REVIEW

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In the literature, the impact of firm size and age on exporting has been extensively studied (e.g., Williams, 2011; Wagner 2015). Concerning size, the positive relationship between size and exporting can be explained by the transaction cost approach (Verwaal & Donkers, 2002), which also corresponds to sunk costs (Melitz, 2003). Since internationalization involves high fixed costs related to specific investments to manage the export activities, as well as to a higher level of uncertainty present in foreign markets, larger firms are more able to capture economies of scale than smaller ones. Furthermore, according to the resource-based view, we can argue that a positive relationship exists between company size and export activity. This is because larger firms have greater organizational capabilities, corresponding to the ability to transform financial and physical resources into competences that are "partially analogous to entry barriers" (Wernefelt, 1984, p. 173).

There are also some arguments supporting a greater internationalization of small firms because they are more flexible and faster in recognizing opportunities and in adapting to changes in the environment (Lee et al., 2012). However, the most extended literature highlights that size positively influences export behavior (e.g., Wagner, 2015; Williams, 2011; Cassetta et al., 2020) because a large size allows important economies of scale to be gained (Nooteboom, 1993), in contrast to small firms that have limited resources and higher risk aversion (Bonaccorsi, 1992). Nevertheless, some

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scholars do not find any effect (Verwaal & Donkers, 2002), and still others find a negative effect (Patiblanda, 1995). In view of all the considerations above, we formulate the following hypothesis:

*H1: The larger firms are more likely to export.*

Concerning age, the born global literature (Madsen & Servais, 2017; Oviatt & McDougall, 1994) underlines that age is not a critical factor of firms' internationalization, highlighting the phenomenon of small startups exporting at inception or in the first years following. According to Knight and Cavusgil (1996, p. 11), born global firms are "[usually] small, technology-oriented companies that operate in international markets from the earliest days of their establishment". This feature of being born internationalized is explained by several factors: i) the ability to operate in specific market niches (especially in high-tech market segments) thanks to distinctive skills; ii) high technological ability in strategic areas (e.g., production, transportation, and communication) that favors the overcoming of many barriers to internationalization; iii) the propensity for global networks and alliances; iv) entrepreneurs-managers who are more skilled in seizing business opportunities worldwide (Rialp-Criado et al., 2010). Nevertheless, it should be specified that the born global literature usually refers to high-technology firms, especially in the service sector, while our analysis is based on the manufacturing sector, including both high and low-technology intensive sectors.

More in general, many studies find a positive relationship between age and export (e.g., Wagner, 2015; Sheard, 2014). The explanation is that a firm acquires more knowledge over time (e.g., Autio et al., 2000) that allows for lowering the fixed costs of entry into new markets (Sheard, 2014) and for overcoming the "liability of foreignness" (Hymer, 1976) and the "liability of newness" (Stinchcombe, 1965), which are the main barriers to internationalization, especially for younger firms (Rhee, 2002). Thus, in line with all the arguments above, we define the following hypothesis:

*H2: The older firms are more likely to export.*

Examining relations between family management modes and export propensity is a relatively new field of study comparing the above-described factors. Meanwhile, family firms are one of the most common types of firm, playing an important role across all economies (La Porta et al., 1999). It was recognized that family firms behave differently from non-family ones (Chua et al., 1999; Miller et al., 2010), with relevant impacts on competitiveness

(Carney, 2005) – taking into account the Socio-Emotional Wealth (Gomez-Mejia et al., 2011; for the Polish case specifically, e.g., Bratnicka-Myśliwiec et al., 2019) – including internationalization (e.g., Daszkiewicz & Wach, 2014).

The literature on family firms' internationalization is receiving increased attention (for an extensive review of the literature, e.g., Casprini et al., 2020; Kontinen & Ojala, 2010; Pukall & Calabrò, 2014), even if so far the findings are still inconsistent (Pukall & Calabrò, 2014). Specifically, the involvement of family or non-family members in management is recognized as one of the main determinants influencing performance in a family firm (Cucculelli et al., 2021; Pini, 2019; Carney, 2005). A large part of the studies finds that family firms are less likely to export than non-family ones (e.g., D'Angelo et al., 2016), while others find the contrary (Minetti et al., 2015). There is also a strand of the literature that finds an inverted-U relationship between family governance and internationalization (Sciascia et al., 2012).

There are different reasons supporting a positive or negative effect of family management on export behavior. The long-term commitment and horizon of family-managed firms (Miller & Lebreton-Miller, 2005) are the main reasons explaining the fact that they are more internationalized, because they are more willing to sustain the upfront fixed costs of exporting to achieve long-term results. The reasons supporting the contrary are essentially two. The first regards the lack of resources of family-managed firms for international growth because of their lower openness to external funding. Internationalization requires extensive financial resources (e.g., for adapting products to foreign customers and to set up production and distribution in various countries) that often need the support of external resources, such as shareholders or venture capitalists. In the face of that, family-managed firms are unwilling to seek outside investors because they want to keep the full authority and control in the hands of the family members (Hennart et al., 2019; Gomez-Mejia et al., 2011). The second reason concerns the lack of managerial skills of the family managers for international openness (Kontinen & Ojala, 2010; Fernández & Nieto, 2014; Pukall & Calabrò, 2014): they have fewer competencies in global competition than non-family managers (e.g., Banalieva & Eddleston, 2011). Family firms mostly prefer to hire family members as managers, also for fear of losing control. This may limit the internationalization process since family managers have less competencies in global competition than non-family managers (e.g., Banalieva & Eddleston, 2011).

This second reason sheds light on the importance of the management issue. Most studies argue that family-managed firms are less likely to export (e.g., Kontinen & Ojala, 2010; Fernández & Nieto, 2014; Pukall & Calabrò, 2014), in contrast to others showing opposite results (e.g., Marinova & Marinov, 2017). Recently, Hennart et al. (2019), analyzing a large sample of four European

countries, found that family-managed SMEs are less internationalized, but those operating in global niches are more internationalized because selling niche products requires fewer resources related to experienced international managers and external capital. Thus, according to the above considerations, we posit the following hypothesis:

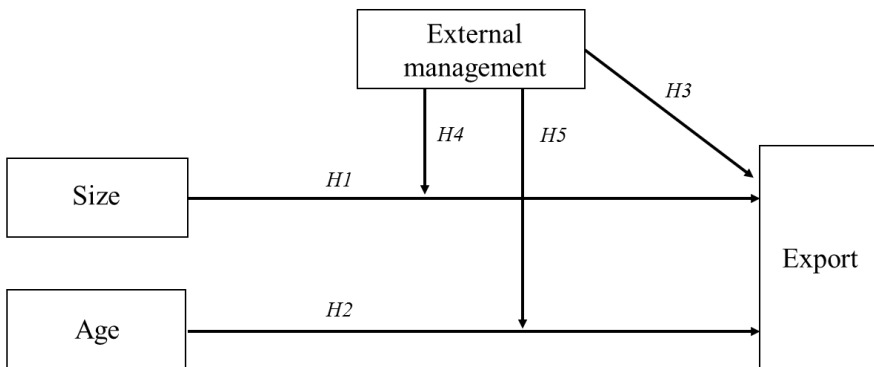
*H3: Family-owned firms run by external managers are more likely to export.*

Furthermore, if H1 and H2 are accepted, we can test if external management exerts a positive role (moderation effect) in supporting the ability to export of the smaller firms on the one hand and of the younger ones on the other hand. Thus, we formulate the following two hypotheses:

*H4: External management positively moderates the relationship between the family-managed firm’s smaller size and the likelihood of exporting.*

*H5: External management positively moderates the relationship between the family-managed firm’s younger age and the likelihood of exporting.*

The hypothesized conceptual model is as follows (Figure 1):



**Figure 1.** Hypothesized conceptual model



## METHODOLOGY

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### Data

For Poland, the dataset refers to a survey carried out in 2015 among firms with at least 10 employees. The data was collected via the CATI (Computer-Assisted Telephone Interview) method using a questionnaire in line with the EFIGE (European Firms in a Global Economy) questionnaire (Altomonte & Aquilante, 2012). In particular, the EFIGE project was an inspiration for establishing a similar database in Poland within the project “The euro introduction and competitiveness of the Polish enterprises” conducted at the University of Warsaw and financed by the National Science Centre. Thanks to the memorandum of understanding between the Bruegel think-tank and the University of Warsaw, the survey was based on the questionnaire used in the EFIGE survey. Specifically, the Polish survey replicated 50 questions from the EFIGE questionnaire (Altomonte & Aquilante, 2012), choosing those that were “structural” in nature. They cover six areas of firms’ characteristics: structure (ownership, domestic and foreign control, management); workforce (skills, type of contracts, domestic vs. migrant workers, training); investment, technological innovation, R&D (and related financing); export and internationalization processes; market structure and competition; financial structure and bank–firm relationship. The sample is representative in terms of the industrial structure based on the NACE rev.2 classification and at the NUTS 2 regional level. Besides manufacturing sectors, the survey also included some firms operating in wholesale trade.

For Italy, we used a survey carried out via the CATI method by Unioncamere (Italian Union of Chambers of Commerce) in 2015. The survey refers to a representative sample of firms operating in all economic sectors (agriculture, manufacturing, and services) with a number of employees between 1 and 249. The sampling stratification was based on three dimensions of the firm: i) size class; ii) economic sector according to the NACE rev.2 classification; iii) geographical location at the NUTS 2 regional level. Also, this survey was based on several parts of the EFIGE questionnaire, collecting information on the following themes: ownership and management; export propensity; innovation activities; financial resources and bank–firm relationship. We chose to focus the analysis on small and medium-sized manufacturing firms with a number of employees between 10 and 249 in view of the following reasons: the export issue is more related to manufacturing activities; the Italian survey does not cover large firms (>250 employees); the Polish survey is oversampled for the large firms and it does not cover firms with less than 10 employees. The number of manufacturing SMEs studied is 1,146 for Italy and 683 for Poland.

## Variables description

Our dependent variable is a dummy variable measuring the export propensity (*export*): it takes value 1 if the firm exports and 0 if the firm does not export. Concerning the main independent variables, we measured size using the number of employees (*size*), and to capture the business experience, we included the firm's age in terms of the number of years since inception (*age*) (e.g., Caldera 2010; Minetti et al., 2015).

With regard to family firms, in the literature, there are many definitions of family firms (Chua et al., 1999). We consider family firms according to the presence of the family in the capital ownership (Donckels & Lambrecht, 1999). Specifically, family firms are those directly or indirectly controlled by an individual or a family-owned entity: we used the following question present in both questionnaires: "Is your firm directly or indirectly controlled by an individual or family-owned entity?". Among family firms, we considered the presence of the family in the management by differentiating family firms run by family members from family firms run by non-family members (Le Breton-Miller et al., 2011). Thus, using the question "Is the chief executive officer (CEO)/Company Head of your firm...?", we constructed two dummy variables: one valued 1 if the firm answered "the individual who owns or controls the firm or a member of the family that owns/controls it"; another measuring the second typology of management (external managers) valued 1 if the firm answered in other ways ("a manager recruited from outside the firm"). Thus, we considered two different types of family-owned firms: i) family-owned firms run by family managers (*family\_manag\_fam*); ii) family-owned firms run by external managers (*fam\_manag\_external*).

We control for innovation because, in the literature, there is a large consensus on the importance of this factor in supporting firm internationalization (e.g., Cassetta et al., 2020). Specifically, the questionnaires ask each firm: a) "On average in the last three years, did the firm carry out any product innovation?" b) "On average in the last three years, did the firm carry out any process innovation?". In line with other studies on innovation and export (e.g., Caldera, 2010; Gajewski & Tchorek, 2017; Van Beveren & Vandebussche, 2010), we constructed two dummy variables: the first valued 1 if the firm introduced product innovation (*innov\_prod*); the second valued 1 if the firm introduced process innovation (*innov\_proc*).

**Table 1.** Variables description

<b>Variables</b>	<b>Description</b>
<i>Dependent variable</i>	
export	Dummy variable: 1 if the firm exports
<i>Main Independent variables</i>	
size	Continuous variable: number of employees
age	Discrete variable: number of years since inception
fam_manag_fam	Dummy variable: 1 if the firm is controlled by an individual or family-owned entity and run by family members
fam_manag_external	Dummy variable: 1 if the firm is controlled by an individual or family-owned entity and run by non-family members
<i>Control variables</i>	
innov_prod	Dummy variable: 1 if the firm introduced product innovation in the last three years
innov_proc	Dummy variable: 1 if the firm introduced process innovation in the last three years
reg_lessdevelop	Dummy variable: 1 if the firm is located in a less developed region
sector_HT	Dummy variable: 1 if the firm operates in a high/medium-high technology intensive sector
banks	Dummy variable: 1 if the firm has multiple banks

We control for other factors that are likely to influence the export propensity. According to Dunning (1997), Robertson and Chetty (2000), the location advantage – e.g., knowledge-based assets, infrastructure and technology, and more in general, a benign domestic environment – shapes the firm’s competitiveness. Robertson and Chetty (2000) suggested that firms generally perform better when they face a benign domestic environment. In Italy, there are wide differences between Centre-North and South in terms of endowment and quality of infrastructure and the economic development level (e.g., Di Bernardino et al., 2017). Indeed, according to EUROSTAT regional indicators, the GDP per capita of Southern Italy is lower by 50% than the Centre-North. For Poland, the structural and economic differences regard Western and Eastern Poland, in terms of infrastructure, business sector structure (e.g., importance of family-run businesses, intensity of competition), role and size of the economic base (for more details with reference also to export performance, e.g., Gajewski & Tchorek, 2017). In this case, always on the basis of GDP per capita (source: EUROSTAT), the value of Western Poland is higher by 30% than Eastern Poland. Moreover, in both countries, the disadvantages of less developed regions (Southern Italy and Eastern Poland)

regard also the geographical position, since they are farther away from EU markets: Germany, France (the main EU countries of Italian export) in the case of Southern Italy; Germany, the Czech Republic, and the Baltic Sea with its ports in the case of Eastern Poland. Thus, we control for the geographical location, including a dummy variable equal to 1 if the firm is located in a less developed region (*reg\_less\_developed*): corresponding to the south in the case of Italy, and to the east in the case of Poland.

To account for the fact that technology-intensive sectors are more export-oriented according to several scholars (e.g., Zou & Stan, 1998), we included a dummy variable (*high-tech*) taking value 1 if the firm belongs to high/medium-high technology intensive sectors (we used the EUROSTAT classification of manufacturing industries by technological intensity) (Sarra et al., 2019). Although many common questions on the bank–firm relationship issue were not answered, we control for external finance using as a proxy the numbers of banks (*banks*) including a dummy variable equal to 1 if the firm has multiple banks (Bartoli et al., 2014).

### Econometric model

We investigate the determinants of exporting by comparing Italy and Poland. Our dependent variable is the export propensity. As it is a binary variable taking only values 1 and 0, we used a binary response model, since it allows to overcome the two most important disadvantages of the linear probability models: the fitted probabilities can be less than zero or greater than one; the partial effect of any independent variable is constant (Wooldridge, 2016, p. 525). To capture the binary effect of the dependent variable it is possible to use the logit or probit models. Even though they are almost interchangeable, the probit implies a normal distribution of errors, while the logit gives a standard logistic distribution of errors; however, in econometrics, probit models are more popular because economists prefer the normality assumption for  $\mathcal{E}$  (Wooldridge, 2016, p. 527). We used the following probit specification:

$$Prob(EXP = 1)_i = \Phi(\beta_0 + \beta_1 SA_1 + \beta_2 F_1 + \beta_3 C_1 + \varepsilon_i)$$

where *EXP* represents the probability that the firm *i* exports. *SA* is a vector of variables capturing firms' characteristics related to size and age; *F* is a vector of variables capturing the different type of management of family-owned firms (run by family members: *fam\_manag\_fam*; run by external members: *fam\_manag\_external*); *C* is a vector of control variables concerning innovation (*innov\_prod*, *innov\_proc*), geographical location (*reg\_*

*less\_developed*), economic sector (*sector\_HT*), banks relationship (*banks*) (for more details, see Table 1). All variables are binary except for age and size.  $\Phi$  is a standard normal cumulative distribution function, taking only values strictly between zero and one for all values of the parameters and the independent variables. Thus, this ensures that the estimated response probabilities are between zero and one  $0 < \Phi(z) < 1$ . Finally, is the normally distributed random error with zero mean and constant variance  $N(0, \sigma^2)$  that captures any other unknown factors.

To quantify the effects on the probability success  $P(Y_i=1)$ , we calculated the marginal effects: they indicate “the effect on the conditional mean of  $Y$  of a change in one regressor, that is to say  $x_j$ ” (Cameron & Trivedi, 2010, p. 343). Specifically, for binary independent variables, marginal effects show how  $P(Y=1)$  changes as the independent variable changes from 0 to 1, after controlling for the other variables in the model. For the continuous independent variable, marginal effects show how  $P(Y=1)$  changes as the independent variable changes by 1 unit (Cameron & Trivedi, 2010; Williams, 2012). We used average marginal effects at the means (MEMs). Stata version 15 was used for all the estimates.

## Summary statistics

Table 2 displays the summary statistics. Polish firms are more export oriented: the share of exporting firms is 87.0% compared with 56.4% of Italian firms. Italian firms are older than the Polish ones, showing an average age higher by 12 years (37 vs 25 years), and smaller since the average size is 36 employees versus 66 employees for Poland. In terms of family ownership, the Italian sample shows a higher share of family firms than in the Polish case (91.6% vs 61.2%). However, from the perspective of management, family firms in Poland are more open to external management: 12.2% of Polish family firms are run by non-family managers versus 9.4% in the Italian case. In the case of innovation, Polish firms are more innovative than the Italian ones, both in terms of product innovation (62.5% vs 25.6%) and process innovation (42.3% vs. 18.4%). In less developed regions of each country, almost 20% of firms are located in the Italian case, about 16% for Poland. The share of firms having multiple banks in Italy is higher than in Poland (87.3% vs 71.9%).

The collinearity problem does not emerge since correlation coefficients are all below the critical value of 0.7 (Tabachnick & Fidell, 1996) and the values of Variance Inflation Factor (VIF) are below the critical threshold of 10 (Yoo et al., 2014). Tables of the correlation matrix are available upon request.

**Table 2.** Summary statistics

	Italy				Poland			
	Obs	Mean	Min	Max	Obs	Mean	Min	Max
export	1,146	0.564	0	1	683	0.870	0	1
size	1,146	35.889	10	241	683	66.139	10	249
age	1,146	36.839	7	118	683	25.003	5	118
fam_manag_fam <sup>(a)</sup>	1,146	0.830	0	1	683	0.537	0	1
fam_manag_external <sup>(a)</sup>	1,146	0.086	0	1	683	0.075	0	1
innov_prod	1,146	0.256	0	1	683	0.625	0	1
innov_proc	1,146	0.184	0	1	683	0.423	0	1
reg_lessdevelop	1,146	0.191	0	1	683	0.158	0	1
sector_HT	1,146	0.266	0	1	683	0.199	0	1
banks	1,146	0.873	0	1	683	0.719	0	1

Note: (a) The family-owned firms are 91.6% in Italy and 61.2% in Poland. Among family-owned firms, *fam\_manag\_fam* is 90.2% for Italy and 87.8% for Poland, and *fam\_manag\_external* is 12.2% for Poland and 9.4% for Italy.

## RESULTS

### Main results

Table 3 and Figure 2 report the results. Concerning size, which is the matter of the first hypothesis, in both countries, the larger the firm, the greater the likelihood of exporting, confirming the results obtained by, e.g., Caldera (2010), Bartoli et al. (2014), and Cassetta et al. (2020). More specifically, we find a higher significance of the marginal effect of *size* in the regression for Italy ( $p < 0.01$  vs  $p < 0.05$  for Poland), which could be as a result of the fact that the average size of the Polish firm is higher.

When it comes to verification of the second hypothesis, business experience proves to be a significant determinant of the export propensity only in the Italian case: the marginal effect of the firm’s *age* is significant ( $p < 0.05$ ) and positive, indicating that the older the firm, the greater the probability that the firm exports, in line with, e.g., Minetti et al. (2015) and Wagner (2015); while for Poland we do not find any significant effect.

Regarding corporate governance, for Poland we find a negative significant effect at 10% in the case of family firms run by family members (Column B), confirming the findings obtained by several scholars indicating that this factor can have a constraining effect on export performance (e.g., Kontinen & Ojala, 2010; Pukall & Calabrò, 2014). Based on that, the third hypothesis is confirmed.

While concerning non-family management, combined with the size of the company, which is the subject of the fourth hypothesis, we find a moderation effect of external management in increasing the likelihood of exporting in the case of smaller firms in Poland and in the case of younger firms in Italy. Indeed, in Poland, external management in family firms increases the probability of exporting by reducing the number of employees: namely, the smaller the firm, the greater the probability of exporting if the family firm is run by external managers (the marginal effect of *fam\_manag\_externalXsize* is negative and significant at 5%, Column D).

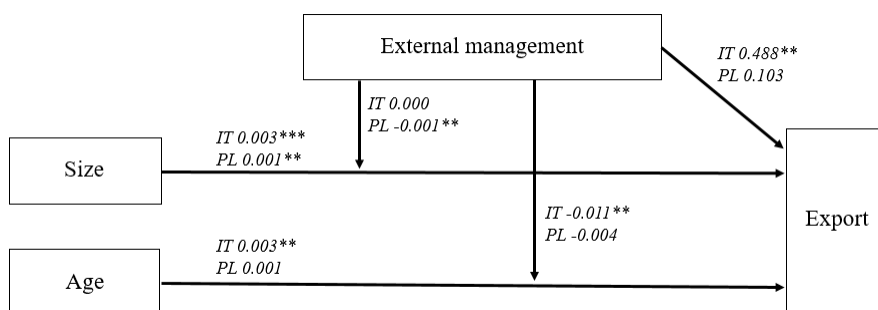


Figure 2. Results of the hypothesized conceptual model

Table 3. Main results: total sample

	Baseline results		The moderating effect of family management on size		The moderating effect of family management on age		Pool DB
	IT	PL	IT	PL	IT	PL	
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
size	0.003*** (0.001)	0.001** (0.000)	0.005*** (0.001)	0.000 (0.000)	0.003*** (0.001)	0.001** (0.000)	0.002*** (0.000)
age	0.003** (0.001)	0.001 (0.001)	0.003** (0.001)	0.001 (0.001)	0.008** (0.004)	0.001 (0.001)	0.002*** (0.001)
fam_manag_fam	0.038 (0.057)	-0.051* (0.026)	0.120 (0.087)	-0.080** (0.037)	0.237 (0.160)	-0.079 (0.058)	-0.032 (0.035)
fam_manag_external	0.075 (0.075)	-0.012 (0.050)	0.079 (0.103)	0.084 (0.077)	0.488** (0.206)	0.103 (0.106)	0.005 (0.050)
fam_manag_famXsize			-0.002 (0.002)	0.001 (0.001)			
fam_manag_externalXsize			0.000 (0.000)	-0.001** (0.000)			
fam_manag_famXage					-0.005 (0.004)	0.001 (0.002)	
fam_manag_externalXage					-0.011** (0.005)	-0.004 (0.003)	
innov_prod	0.244*** (0.038)	0.060** (0.024)	0.244*** (0.038)	0.054** (0.024)	0.246*** (0.038)	0.057** (0.024)	0.175*** (0.025)

	Baseline results		The moderating effect of family management on size		The moderating effect of family management on age		Pool DB
innov_proc	0.029 (0.042)	0.019 (0.024)	0.028 (0.042)	0.022 (0.024)	0.026 (0.042)	0.017 (0.024)	0.032 (0.027)
reg_lessdevelop	-0.135*** (0.040)	-0.037 (0.033)	-0.137*** (0.040)	-0.032 (0.032)	-0.133*** (0.040)	-0.034 (0.033)	-0.099*** (0.029)
sector_HT	0.113*** (0.036)	0.044 (0.032)	0.112*** (0.036)	0.038 (0.032)	0.115*** (0.036)	0.042 (0.032)	0.096*** (0.027)
banks	0.254*** (0.049)	0.089*** (0.026)	0.258*** (0.050)	0.084*** (0.025)	0.257*** (0.050)	0.089*** (0.026)	0.184*** (0.030)
Italy							-0.280*** (0.032)
Obs.	1,146	683	1,146	683	1,146	683	1,289
Wald chi-square	163.38***	41.35***	170.96***	49.25***	168.14***	47.19***	282.32***
Pseudo R <sup>2</sup>	0.132	0.088	0.134	0.102	0.135	0.094	0.191

Note: Dependent variable: exp = 1 if the firm exports, 0 = otherwise. Table displays marginal effects at the means (MEMs). Robust standard errors in parentheses. Wald test of the model specification is reported. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

When it comes to confirmation of the fifth hypothesis, in Italy, management openness to non-family members is even a more important determinant of exporting for family firms, since we find two significant results. The first, family firms run by external managers are more likely to export ( $p < 0.05$ , Column E), in line with Minetti et al. (2015). Second, management openness increases the likelihood of exporting for younger firms: namely, the younger the firm, the greater the probability of exporting if the family firm is run by external managers (the marginal effect of *fam\_manag\_externalXage* is negative and significant at 5%, Column E).

Concerning the control variables, in both countries, the firms that carry out product innovation are more likely to export, in line with many scholars (e.g., Van Beveren & Vandenbussche, 2010; Caldera, 2010; Añón Higón & Driffield, 2011), while we do not find any significant effect for process innovation, confirming the findings by Becker and Egger (2013). In particular, the marginal effect of product innovation (*innov\_prod*) for Italy is statistically more significant ( $p < 0.01$  vs.  $p < 0.05$  for Poland) (Columns A-B).

Controlling for the location, our results suggest that operating in a less developed region significantly ( $p < 0.05$ ) decreases the likelihood of exporting in Italy, as also found by Minetti et al. (2015), whereas no effect emerges for Poland.

Regarding the role of banks, our results suggest that firms having multiple banks have a higher probability of exporting ( $p < 0.01$ ) in both countries, confirming the findings by Bartoli et al. (2014): the marginal effect of *banks* is positive and significant at 1% in all models.



Overall, the regression of the entire dataset reveals that Italian firms are less likely to export than Polish ones: the marginal effect of the dummy variable *Italy* is negative and highly significant ( $p < 0.01$ ) (Column G).

### Robustness check

Table 4 reports the robustness check analyses. We carried out estimations on the subsample of family-owned firms to test the robustness of the role played by external management in fostering openness to foreign markets.

**Table 4.** Robustness check: subsample family-owned firms

	Baseline results		The moderating effect of family management on size		The moderating effect of family management on age		Pool DB
	IT	PL	IT	PL	IT	PL	Pool IT-PL
	(A)	(B)	(C)	(D)	(E)	(F)	(G)
size	0.003*** (0.001)	0.001** (0.000)	0.003*** (0.001)	0.001** (0.001)	0.003*** (0.001)	0.001** (0.000)	0.002*** (0.000)
age	0.003** (0.001)	0.001 (0.001)	0.003** (0.001)	0.003 (0.001)	0.003** (0.001)	0.002 (0.002)	0.002*** (0.001)
fam_manag_external	0.039 (0.055)	0.036 (0.054)	-0.026 (0.076)	0.167** (0.085)	0.255* (0.147)	0.200* (0.119)	0.005 (0.050)
fam_manag_externalXsize			0.000 (0.000)	-0.001*** (0.000)			
fam_manag_externalXage					-0.006* (0.003)	-0.006* (0.004)	
<i>+ controls</i>							
Obs.	1,050	418	1,050	418	1,050	418	1,289
Wald chi-square	139.82***	26.94***	144.94***	32.55***	142.09***	32.76***	282.32***
Pseudo R <sup>2</sup>	0.120	0.094	0.121	0.116	0.122	0.103	0.191

Dependent variable: *exp* = 1 if the firm exports, 0 = otherwise. Table displays marginal effects at the means (MEMs). Robust standard errors in parentheses. Wald test of the model specification is reported. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

The results confirm the following issues: i) the positive effect of external management (*fam\_manag\_external*) in increasing the likelihood of exporting both for Italian firms (column E, marginal effect: 0.255  $p < 0.10$ ) and Polish ones (column D, marginal effects: 0.167  $p < 0.05$ ; column E, marginal effect: 0.200  $p < 0.10$ ); ii) the moderator role of external management for smaller firms in Poland (the coefficient of *fam\_manag\_externalXsize* is negative and significant at 1%, column D) and for younger firms in Italy (the coefficient of *fam\_manag\_externalXage* is negative and significant at 10%, column E) – in respect of results on the total sample, we also found this effect for the Poland case (column E); iii) the positive and significant effect of size for both countries and of age only for Italy.

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## DISCUSSION

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The results show that in both countries size is a critical factor affecting the export propensity, confirming Hypothesis 1 (*H1: The larger firms are more likely to export*). Nevertheless, the higher significance level for Italy ( $p < 0.01$  vs.  $p < 0.05$  for Poland) may depend on the fact that the average size of Italian firms is much lower (35 vs. 66 employees for Poland), leading to a greater importance of size in the probability of exporting: namely, since size is a critical determinant of exporting, the lower dimension of Italian firms emphasizes the importance of this factor in this country.

However, Hypothesis 2 (*H2: The older firms are more likely to export*) is valid only in the Italian case and not for the Polish one: this supports the idea that working in an internationally more open environment like that of Poland – shows a higher integration in global value chains (GVC) (OECD, 2017) and export propensity than Italy (export-to-GDP 44% vs. 26%) – may also help younger firms to overcome the barriers to internationalization (empirical studies for Poland demonstrated that working in GVC increases a firm's competitiveness, e.g., Ratajczak-Mrozek, 2012). For Poland, an important factor can also be the fact of joining the EU in 2004 with the increasing population of young companies that are export oriented.

Results on corporate governance underline that non-family management positively affects the probability of exporting in both countries, confirming Hypothesis 3 (*H3: Family-owned firms run by external managers are more likely to export*): this supports the idea that external managers can foster the firm's international openness providing more skills in global competition (e.g., Pukall & Calabrò, 2014; Banalieva & Eddleston, 2011).

Related to this, the results confirm Hypothesis 4 (*H4: External management positively moderates the relationship between the family-owned firm's smaller size and the likelihood of exporting*) for Poland and Hypothesis 5 (*H5: External management positively moderates the relationship between the family-owned firm's younger age and the likelihood of exporting*) for Italy. The latter suggests that in Italy, young family firms may lack several elements – e.g., skills and experience – for starting to export, and external managers become determinant in filling these voids. Furthermore, the low spread in Italy of exporting firms may not help young family firms to benefit from external spillovers (skills, knowledge, etc.) often generated by the presence of exporters in the surrounding environment.

Finally, concerning control variables, the higher impact (higher marginal effect with a higher level of significance) of product innovation in Italy on the export propensity could be explained by the fact that the Italian export is strictly related to the originality of the final goods produced – from which the

term “Made in Italy” comes – which requires constant and intense product innovation. While, the evidence that the location in the less developed region negatively influences the probability to export only for Italy, could also be explained by the fact that in Italy the gap between the less developed region and the more advanced one, is higher than in Poland; in the case of Poland, its poorer regions also strongly benefit from structural funds that increase companies’ competitiveness and internationalization.

## CONCLUSION

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This paper analyzed the determinants of exporting, focusing on age and size, and studied if external management (non-family members) matters in playing a moderating role in increasing the likelihood of exporting for the firms often less prone to sell abroad (the smaller firms and the younger ones). By comparing Italian and Polish manufacturing SMEs, this addresses a recently pointed out gap in the literature regarding a lack of cross-sectional analysis that includes other European countries besides the main more advanced ones (Hennart et al., 2019).

We found that size increases the probability of exporting in both countries, with a higher significance in Italy than in Poland. Older firms are more likely to export in Italy, while in Poland the firm’s age is not a determinant of exporting. Concerning family firms and management, external (non-family) management increases the likelihood of exporting for younger family firms in Italy and for smaller family firms in Poland. These results are robust when also considering (instead of the whole sample) the subsample of family-owned firms.

Furthermore, the results show that: i) product innovation is a driver of exporting in both countries, with a higher effect in Italy than in Poland; ii) geographical location (being located in less or more developed regions) affects the probability of exporting in Italy but not in Poland.

These findings involve several policy implications. The first message that we can put forward for policy makers concerns the need to favor management openness to external managers for family-owned firms, which can lead to an important change of mentality in terms of the firm’s competitiveness. While Italian and Polish companies differ in some aspects, they also have many important features in common. Both societies are Catholics with a very privileged role of the family. Despite the fact that one country is developed and the second is developing, they might face similar problems in the area of family management issues.

Since size is a strong determinant of export propensity, in particular in Italy, the second message that emerges is that small firms require greater support from the institutions in encouraging exporting behavior. This proves to be an important role of the trade promotion organizations that should focus specifically on smaller firms.

In Italy, Chambers of Commerce have a dedicated function (defined by law) to sustain firms' internationalization. For instance, the "*Progetto SEI*" ("*SEI Project - Support to Export of Italy*") operated by Unioncamere (Italian Union of Chambers of Commerce) is aimed at increasing exporting firms (especially among those smaller) by focusing on the potential exporters, on one hand, and strengthening the presence of the sporadic exporters in foreign markets, on the other hand, through services of information, training, and assistance (e.g., check-up of firm's needs, best markets identification, strategy definition for entering the markets identified as targets, web mentoring, accompanied missions to export markets).

While in Poland, the Polish Agency for Enterprise Development (PARP) provides financial instruments to help SME internationalization (in particular in Eastern Poland) and help small and young companies gather capital and finance investments in management skills. Moreover, other important support is provided by the Polish Investments and Trade Agency (PAIH) through several projects and services aimed at favoring the foreign expansion of start-ups and SMEs with high potential.

Finally, the third message concerns the need to consider jointly the issues of innovation, internationalization and family management modes in the agenda of the firm's competitiveness. In this regard, policy innovation should also concentrate on product innovation and not only on process innovation; the latter is very important with a more incremental character increasing competitiveness but with a less direct effect on entering foreign markets.

While size is one of the most obvious and important determinants of export activity, the public support should be directed at stimulating company growth. Taking into account that a sequential internationalization mode is in force (companies start to operate on the local market and then go abroad), critical action should be provided to conduct favorable conditions for firms' operation. Allowing companies to grow and support their survival, assures a larger population of those ready to be a part of the self-selection race, increasing overall efficiency in export activity.

As the Doing Business 2020 measures reveals, obstacles to growth in both countries are related to institutional factors. The main drawbacks of the Polish economy are those related to starting business procedures, registering property, paying taxes, getting electricity, while in the case of Italy, the main problems are rooted in construction permits, getting credit, paying taxes,

and enforcing contracts. Removing obstacles to growth might demand an individual, sectoral and microeconomic approach, addressing the most current and profitable fields of critical changes in the particular country. In both cases, more organizational and ecosystem resilience is needed, based on local clusters and valleys creating conditions for competition, cooperation, and common market goals. It should be accompanied by more openness to the internationalization of management, R&D activity, and attraction for foreign companies, technologies, and solutions. An interesting field of study is cultural opening in the context of immigrants' inflow in both countries and their entrepreneurial activity.

While concentrating on high growth company segments, it can be a profitable strategy for companies' competitiveness to upgrade, grow and survive. Usually, it demands industrial policy that is able to identify and support industries with latent comparative advantages that can boost the country's economic development. It seems that in the post-Covid environment, the role of macroeconomic and industrial policy should be reconfigured towards challenges related to the new megatrends – e.g., green and competitive energy production, environmental protection and digitalization. In such new, structurally important sectors, the government can become a player not only in shaping the market on the regulatory and supply side, but also in increasing demand incentives and reducing the transaction costs of economic activity. At the early stage of market development, a pragmatic interference of the government in the market mechanism in line with market laws should be welcomed.

The main limitation of this study is related to comparing imperfectly aligned surveys. Future efforts should be based on overcoming this limitation. This exercise shows that there is considerable scope for combining international research, not only in the current studies but mainly in future ones. This analysis represents only a first step towards future lines of research, as others could focus on several themes, such as global value chains (GVC) with regard to the issue of internationalization; women ownership and management concerning corporate governance; the Triple Helix concerning the moderator factors in improving firms' openness to export.

## **Acknowledgments**

We are extremely grateful to Valentina Meliciani for her inspiration and valuable comments to research agenda. We would like to thank Giovanni Ferri and Michał Brzozowski for their valuable suggestions. Marco Pini would also like to extend a special thanks to Tiziana Pompei and Alessandro Rinaldi

for supporting his visiting period at the University of Warsaw, during which it was possible to prepare this article.

## Disclosure

The views expressed by the Authors do not necessarily reflect those of the institutions to which they belong.

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### Abstrakt

**CEL:** W artykule dokonano analizy determinant eksportu w ujęciu międzynarodowym porównując Włochy i Polskę. Analiza jest skoncentrowana na trzech celach: i) zbadaniu, czy wiek i wielkość firmy wpływają na prawdopodobieństwo eksportu; ii) czy istnieją różnice między zarządzaniem firm rodzinnych a nierodzinnych; iii) czy i w jaki sposób kierownictwo spoza rodziny pozytywnie moderuje związek między wiekiem a wielkością firmy w kontekście umiędzynarodowienia. **METODYKA:** Analiza mikroekonomiczna z wykorzystaniem regresji probitowych na zintegrowanej bazie dwóch badań przeprowadzonych we Włoszech i w Polsce na reprezentatywnych próbach MŚP (1100 dla Włoch i 680 dla Polski). Kontrolujemy kilka czynników, takich jak innowacyjność, położenie geograficzne, sektor gospodarczy i relacje z bankami. **WYNIKI:** W obu krajach większe firmy mają rosnące prawdopodobieństwo eksportu, z wyższym efektem we Włoszech niż w Polsce. Doświadczenie biznesowe okazuje się czynnikiem wpływającym na prawdopodobieństwo eksportu tylko we Włoszech (w sensie pozytywnym: starsze firmy częściej eksportują), a nie w Polsce. Zarządzanie poprzez osoby z zewnątrz (nierodzinne) jest siłą napędową umiędzynarodowienia firm rodzinnych, zwłaszcza młodszych firm we Włoszech i mniejszych firm w Polsce. **IMPLIKACJE:** i) rola ładu korporacyjnego może różnić się w poszczególnych krajach w kontekście konkurencyjności przedsiębiorstw; ii) sprzyjanie otwartości kierownictwa na menedżerów zewnętrznych w firmach rodzinnych; iii) małe firmy wymagają większego wsparcia w zachęcaniu do działań eksportowych; iv) zasadne jest wspólne rozważanie kwestii innowacji, internacjonalizacji i ładu korporacyjnego (zarządzanie rodzinne/nierodzinne) w programach wspierania konkurencyjności firm. **ORYGINALNOŚĆ I WARTOŚĆ:** Artykuł stanowi wkład do nurtu literatury dotyczącej determinant eksportu, badając jednocześnie cechy firm związane z wielkością i wiekiem oraz ładem korporacyjnym, które zwykle są rozpatrywane oddzielnie. Ponadto artykuł próbuje wypełnić lukę związaną z brakiem badań międzynarodowych skupiających się na krajach UE, innych niż te bardziej zaawansowane.

**Słowa kluczowe:** umiędzynarodowienie, firmy rodzinne, innowacje, MSP, determinanty eksportu, zarządzanie w firmach nierodzinnych

### Biographical notes

**Marco Pini** is senior economist at Centro Studi delle Camere di Commercio Guglielmo Tagliacarne (the Research center of the Italian Union of Chambers of Commerce, Rome, Italy). He has been a Visiting Researcher at the Department of Management of Warsaw University (Poland), at the Department of Human

Geography and Planning of Utrecht University (Netherlands), and at the Department of Management of University of Turin (Italy). He works on several research projects at the Italian institutional level (Ministry of Economic Development, Government agencies). He is Adjunct Professor in Industrial Dynamics at LUISS Guido Carli University, Rome, Italy. He has published articles in several international peer-reviewed journals (e.g., *Industry and Innovation*, *Journal of Technology Transfer*, *Technovation*, *Regional Studies*) on the field of innovation, digitalization, Industry 4.0, internationalization, family firms, environmental sustainability, and entrepreneurship.

**Grzegorz Tchorek** graduated from the Faculty of Management, University of Warsaw and received his M.A. degree in Business Management in 2001 and a Ph.D. degree in Economics in 2007 at the same University. His research and scientific activity focus on the economic aspects of monetary integration and internationalization of enterprises, competitiveness and innovation, value chains of various sectors of the economy, challenges of the energy and climate transformation, and industrial policy. Since 2017, his research and publishing activity has been in the field of low and zero-emission solutions and technologies. He is the initiator and head of the Research Center on Energy Transition, Mobility and Climate Change at the Faculty of Management. As well as being a member of the State Council for Environmental Protection at the Minister of Climate and Environment he is also Chairman of the team of experts on hydrogen at the Chamber of the Natural Gas Industry.

### **Conflicts of interest**

The authors declare no conflict of interest.

### **Citation (APA Style)**

Pini, M., Tchorek, G. (2022). Comparative analysis of export determinants in Italian and Polish firms: The moderating role of non-family management. *Journal of Entrepreneurship, Management and Innovation*, 18(2), 41-67. <https://doi.org/10.7341/20221822>



# Amplifying organizational performance from business intelligence: Business analytics implementation in the retail industry

Emmanuel P. Paulino<sup>1</sup> 

## Abstract

**PURPOSE:** The concept of business analytics (BA) and business intelligence (BI) is just emerging in the Philippines. Since these are new concepts, it is important to investigate their impact on organizational performance and the performance metrics in business industry. The aim of this study is to examine the impact of business analytics generating business intelligence and how it affects organizational performance by developing a structural model. Consequently, the impact of organizational performance on other performance metrics was also established. **METHODOLOGY:** The partial least squares – structural equation modeling was utilized, which proposed a model that shows how business intelligence, generated by business BA, affects organizational performance, which consequently leads to improved marketing, financial, and business process performance. A survey was conducted on business analysts and executive managers of retail companies that have already been implementing BA for at least three years. **FINDINGS:** BA capabilities have a significant positive effect on the level of BI. BI has a significant positive effect on organizational performance. However, the result of the moderation analysis indicated that the level of readiness for BA implementation could not be considered a moderating factor on the relationship between BI and organizational performance. **IMPLICATIONS:** Out of the different BA capabilities, the decision support system and business process management were found to be the most beneficial functions in generating BI. BI amplifies organizational performance and consequently improves the marketing and business process performance of retail firms. However, the readiness for BA implementation does not significantly affect how BI improves organizational performance. Overall, it is recommended that in order to enhance marketing and business process performance, retail firms should focus on the BA capabilities of decision support system and business process management. **ORIGINALITY AND VALUE:** This would be the first empirical study in

<sup>1</sup> Emmanuel P. Paulino, DBA, LPT, PLM Business Graduate School, General Luna corner Muralla Streets, Intramuros, Manila, Philippines 1002, e-mail: [eppaulino@plm.edu.ph](mailto:eppaulino@plm.edu.ph) (ORCID: <https://orcid.org/0000-0002-6282-6460>)

Received 26 August 2021; Revised 29 November 2021; 22 December 2021; Accepted 4 January 2022.

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*the Philippines which has assessed how business analytics and business intelligence impact organizational performance. This study is original in determining what BA capabilities generate BI, which translates to improved organizational performance. This study is also unique in defining what key performance metrics are much improved as a result of its implementation. This may serve as a viable reference for other researchers interested in business analytics and other technology about data management applied in business operations.*

**Keywords:** *structural equation model, knowledge-based view, business analytics, business intelligence, organizational performance, retail industry*

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## INTRODUCTION

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The perpetual revolution of information technology has genuinely dictated how industries conduct business today. Nevertheless, with the Fourth Industrial Revolution's advent, the fusion of technologies blurs the lines between the physical, digital, and biological spheres. It elevates the importance of data to become an integral part of conducting business (Beltran, 2018). Data have become the most important intangible resource of a firm, especially in the retail industry.

Retail trade in the Philippines has blossomed in recent years. The Philippine National Statistics Office (2019) counted 637,325 establishments engaged in retail trade in 2018. The Philippine retail industry has fragmented as different overseas companies enter the country. However, it is assumed that the industry will likely experience more significant consolidation and respond to incoming paradigm shifts (Rabo & Ang, 2018). Gomez, Arranz, and Cillan (2012) suggested that in order to be successful, it is critical for retailers to make use of its information resources efficiently and to pursue new strategies promptly. This may be achieved with the help of analytics in the retail supply chain (Gutierrez, 2014). In the Philippines, building customer loyalty is a primary goal for retailers. A retailer's ability to plan and implement measures toward customer retention may be provided by comprehensive business intelligence systems.

Beltran (2018) affirmed that there is still a gap between available technology and how firms use such technology to improve their business efficiency and customer response, both of which lead to better performance. It is where the concept of business analytics comes in. Several studies have already supported how BA generates BI and how these technologies impact organizational performance. But even if some studies have proved that BA generates BI, it can have different results for different situations and locations (Corte-Real, Oliveira, & Ruivo, 2016; Aydiner et al., 2019; Akter et al., 2016; Ashrafi et al., 2019). Current studies also lack exploration as to how each

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BA capability generates BI and its specific impact on the key performance metrics of marketing, finance, and business process performance. This study also finds rationale for several contradicting results found in the previous literature on the impact of BI on organizational performance (Laursen & Thorland, 2010; Sharma et al., 2010; Aydiner et al., 2018; Bedeley et al., 2016; Grover et al., 2018).

Based on these gaps, this study aims to formulate a structural model that may predict and/or explain the quantitative relationship between business intelligence generated by BA capabilities and organizational performance, further translated to the key performance metrics of finance, marketing, and business efficiency. A survey was conducted on 62 retail companies in the Philippines that have already been implementing business analytics for at least three years. These companies represented by 124 respondents (one from top management and one analytics implementer for each company) already using business analytics are surveyed through questionnaires. This is the first empirical study in the Philippines to assess how business analytics and business intelligence impact organizational performance.

## LITERATURE REVIEW

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This study draws its framework from the knowledge-based view (KBV) of the firm, first theorized by Grant (1996) and extended by Kaplan et al. (2001). According to this theory, knowledge is the most significant intangible resource of a firm. It proposes a model that relates knowledge with the firm's capabilities by which it increases organizational performance. Such knowledge can be taken from internal and external sources. It also perceives the firm's resources as the key factors in its performance, thus suggesting that management should focus on harnessing internal capacities and capabilities rather than cogitating on external factors over which the firm has no control. Proponents of this view argue that organizations should focus on the inner strength of the company for its competitive advantage instead of comparing themselves with the competition. It is the knowledge that is the source of organizational performance (Wickramasinghe & Lubitz, 2007).

### **Business analytics and its capabilities**

The earliest literature on business analytics (BA), such as Davenport and Harris (2007), defines it as a successive process of gathering, storing, analyzing, and interpreting meanings of data in order to improve decision-making and organizational performance. Definitions have somehow evolved



through time as more organizations become more perceptive of what BA is all about. Stubbs (2013) defined business analytics as the generation of data-driven insight to produce value. It does so by requiring business relevancy, actionable insight, performance measurement, and value measurement. Laursen and Thorlund (2017) concluded that BA goes beyond just providing intelligent reports. Min (2016) connected business analytics with various quantitative techniques such as statistics, data mining, optimization tools, and simulation. Defining BA becomes more extensive as time passes. BA capabilities that generate competitiveness can be perceived through customer and product dashboards (Glaister et al., 2008). These are real-time reports of the current customer engagement on the different products of the company. It concluded that BA's predictive ability could bring the right raw material and products to the company's delivery chain at the right time and place. BA is also seen to go beyond the advantages of traditional financial analysis (Ouahilal, El Mohajir, Chahhou, & El Mohajir, 2016), stating that with the explosion of data made through digital technology, data analysis has acquired greater prominence than mere financial accounting to be the basis for financial analysis. The most crucial capability of BA is its ability to support decisions based on data analysis. Through the inputs of data, the BA system can see through its algorithms the factors that cause different yields of business operations that guide managers in coming up with sustainable decisions (Glaister et al., 2008; Mithas et al., 2011; Ordanini & Rubera, 2009; Santhanam & Hartono, 2003; Ramanathan et al., 2017; Troilo et al., 2016.).

The researcher used the variables data dashboard, financial analysis, business process management, and decision support systems of business analytics based on the aforementioned literature.

### **Business analytics generating business intelligence**

Sabherwal and Fernandez (2011) supported the idea that "organizations derive strategic decisions from hierarchical layers from data to intelligence." Business intelligence (BI) is the outcome of careful analysis of data through the support of analytics technology (Grossman & Rinderle-Ma, 2015). It can be considered the result of the manifestations of technology, methodology, practices, systems, and techniques involved in analyzing data to help an organization understand its operations, leading to timely decisions. Foley and Gullemente (2011) concluded that BI is a function of business analytics capabilities. Mishra, Hazra, Tarannum, and Kumar (2016) also supported such a conclusion by finding that business analytics significantly affects business intelligence, especially in decision-making activities. Chen et al. (2012) described BA as factors and part of BI. The main difference between

BI and BA is the fact that BA is more specific in its focus, and an argument can be made that BA are factors of BI (Mashingaidze & Backhouse, 2017). This description aligns with the relationships described in Kowalczyk and Buxmann (2014), Chen et al. (2012), and Williams (2016). BI can be manifested through a descriptive understanding of the market. Firms can predict growth opportunities from internal and external data (Parra & Halgamuge, 2018). With the help of business analytics, companies are able to reflect on their internal strengths by deepening their knowledge of what is really happening inside the walls of their organization (Kearns & Sabherwal, 2007; Larson & Chang, 2016). Sabherwal (2007) suggests that BI can be assessed through understanding customer preferences, coping with competition, identifying growth opportunities, and enhancing internal efficiency. Also, Larson and Chang (2016) confirmed that BI is an enabler for the organization to work smarter, which rises from the fact that data analyses are turned into useful information. BI-related factors indeed affect the perceived decision quality (Visinescu, Jones & Sidorova, 2016). Overall, BI is seen when each executive in the organization confidently makes decisions backed up by rigorous data analysis (Grossman & Rinderle-Ma, 2015). Through the understanding of the discussion above, this hypothesis is therefore formulated:

*H1: Business analytics capabilities are significant factors of business intelligence.*

## **Business analytics and business intelligence linked with organizational performance**

The importance of BA and BI in improving corporate and organizational performance is well acknowledged in the literature (Wixom et al., 2013). Several pieces of literature provide evidence of a relationship between BI, BA, and organizational performance. Price optimization and profit maximization are found to be outputs of comprehensive business intelligence (Davenport & Harris, 2007; Schroeck et al., 2012). Sales, profitability, and market share are greatly affected by analytics implementation (Manyika et al., 2011). Aydiner et al. (2018) found that business analytics capabilities generating business intelligence affect the overall business performance of the firm. According to Wixom et al. (2013), BI can increase performance by increasing productivity, which has both concrete (i.e., reduced paper reporting) and intangible (i.e., improved business reputation) benefits. Thus, a firm that creates superior BA should maximize organizational performance by facilitating the pervasive use of insights gained from its business intelligence derived from analytics (McAfee & Brynjolfsson, 2012; Prahalad & Ramaswamy, 2013).

Ramanathan et al. (2017) argue that there appears to be a link between business performance and BA adoption. Corte-Real et al. find that BA and BI add value to the firm by amplifying organizational performance. Businesses that incorporate BA into their operations can outperform their competitors in productivity and in profitability. Many of the previous studies indicate a positive link between the adoption of BA and organizational performance in terms of increased business value (Cotic et al., 2015; Elbashir, Collier & Davern, 2008; Ramanathan et al., 2017). Elbashir, Collier, and Davern (2008) established a strong relationship between business intelligence systems and organizational performance.

However, few works of literature negate the positive link between business intelligence and organizational performance. Gartner (2016) revealed that while investments in big data continued to proliferate, some data reveal contradicting inference. This is due to the fact that there were big data projects that yielded disappointing results. According to Gartner, 60% of big data projects will fail to progress beyond piloting and experimentation in 2017 and will be abandoned. Grover et al. (2018) also identified that some companies find it hard to see a valuable return on their investment, with analytics supporting the idea that business analytics may not have a significant impact on organizational performance. Based on the foregoing, it is therefore hypothesized:

*H2: Business intelligence has a significant effect on organizational performance.*

### **Business analytics implementation and its role as a moderating factor between business intelligence and organizational performance**

In order to implement BA, business organizations must be aware of their infrastructure. Davenport and Harris (2007) found that the essential elements of any analytics infrastructure are the software, number of nodes, data capacity, and the processes involved. This study has adopted this view as it is supported by different literature discussing the same topic. Several studies having different views were shared in using the abovementioned list in defining the infrastructure of any analytics system, such as those of Laursen and Thorland (2010), Sharma et al. (2010), Aydiner et al. (2018), Bedeley et al. (2016), and Grover et al. (2018). The number of nodes refers to the number of devices (e.g., computers and smartphones) wherein they are installed and utilized for such purposes. Data capacity refers to the average number of data involved regularly in the given traffic period and is usually

measured in terabytes (Stubbs, 2013). The intangible component is all about the human resource: its knowledge and technical skills in implementing BA.

Several literature works have linked the firm's readiness for BA implementation with organizational performance outcomes and business intelligence. Jain, Narayanan, and Lee (2019) formulated a model that positively links a firm's BA readiness with business intelligence generated by firms. Ghasemaghaei (2019) found that structural readiness has a positive impact on organizational performance. It identifies the significance of technology infrastructure capability, tool functionality, data volume, and employee analytics capability in determining a firm's structural readiness to use big data analytics. Continuous usage of BA infrastructure leads to more success in the firm's performance (Ramarakrishnan, Khuntia, Kathuria, & Saldanha, 2016). Barton and Court (2012) emphasized a fast return on investment from analytics infrastructure. Gürdür, El-khoury, and Törngren (2019) concluded that in order to increase data analytics usage, firms needed to improve their tools and employee analytics skills. It was stated as an example that if companies continue to train employees and expose them to opportunities in their analytics knowledge, it will probably also enhance analytics capabilities. Prior research has shown that the relationship between business intelligence from big data analytics and organizational performance is influenced by the firm's infrastructure and readiness to implement analytics as a moderating factor (Wamba et al., 2015; Côte-Real et al., 2017). Their research framework commonly exhibits a triangular setup between BA infrastructure, business intelligence, and organizational performance. Such a triangular relationship was explored further by Grossman and Siegel (2014), who concluded that the capacity or readiness to implement business analytics does not affect organizational performance unless it is organized well and BA capabilities are enhanced. With a good understanding of the related literature, this hypothesis is therefore formulated:

*H3: Readiness of business analytics implementation moderates the effect of business intelligence on organizational performance.*

## **Organizational performance and other performance metrics**

Organizational performance refers to how a business organization achieves and realizes its goals (Li et al., 2004) as well as how it enhances competitiveness that strengthens its edge over its competitors (Rahman et al., 2018; Chen et al., 2013; Hogan & Coote, 2014; Carter & Greer, 2013; Lee & Raschke, 2016). To appraise organizational performance, Elbashir, Collier, and Davern (2008) proposed metrics used to capture organizational performance that represent

organizational objectives, competitiveness, and market responsiveness, strengthening the organization's overall performance.

In measuring marketing performance, lead generation can be used as retail companies use online platforms to track customer interactions, whether expressing interest or making an inquiry (Artun & Levin, 2015). Rothman (2014) enumerated different types of leads that can be used as metrics of marketing performance: marketing leads, sales leads, and product leads, which form a marketing funnel.

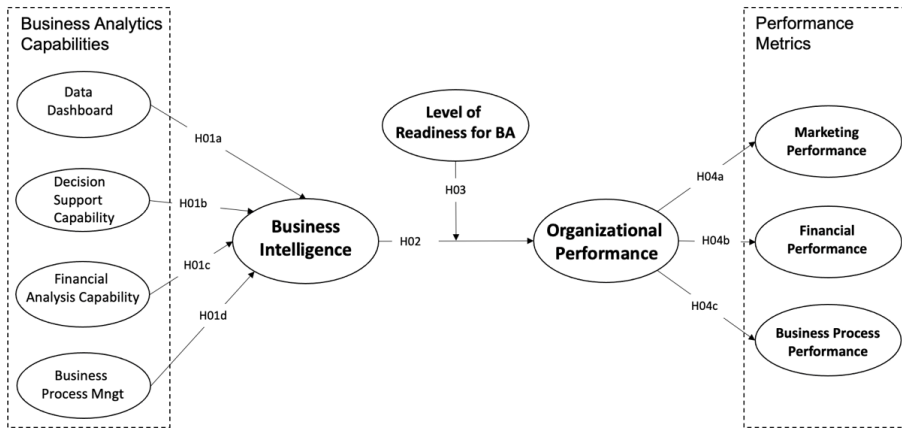
In measuring business process performance, Aydiner et al. (2019), on the other hand, proposed that business efficiency be gauged through efficient inventory management, transaction time with customers, and the efficiency in delivering products. In measuring transaction time, Jaff and Ivanov (2015) used the metrics of input resources order time, move time, product and service processing time. Treville, Shapiro, and Hameri (2013) described transaction lead-time as the functions of setup time, batch processing, waiting time, and delivery of products or services. Financial performance is measured through the marginal increase in sales, net profit, return on assets and return on equity (Ordanini & Gubera, 2009).

Several pieces of literature relate organizational performance with financial performance, marketing performance, and business process performance (Li et al., 2006; Elbashir, Collier, & Davern, 2008; Aydiner et al., 2019; Corte-Real, Oliveira, & Ruivo, 2016) and business process performance (Aydiner et al., 2019; Rahman et al., 2018). In the framework of Corte-Real, Oliveira, and Ruivo (2016), organizational performance affects other performance metrics. Therefore, it is hypothesized that:

*H4: Organizational performance affects other performance metrics such as marketing performance, financial performance and business process performance.*

The related literature supporting the formulation of the hypothesis mentioned can be summarized in this conceptual framework (Figure 1).

Based on the knowledge-based view of the firm, which theorizes that the knowledge of the firm is crucial in increasing organizational performance, this conceptual model postulates that BA capabilities of data dashboard, financial analysis, business process management and decision support system affect and explain the level of business intelligence that a retail company has. Business analytics capabilities and business intelligence represent the knowledge of a firm and are part of the independent variables. Organizational performance is hypothesized to affect the constructs of financial performance, marketing performance, and business process performance.



**Figure 1.** Conceptual framework on the relationship between business intelligence and organizational performance with intervening variables

The model proposes that the level of business intelligence (knowledge) affects and explains the level of organizational performance. The level of readiness of the firm to implement business analytics is theorized to have a moderating effect between business intelligence and organizational performance. It is also hypothesized that the strength of the relationship between business intelligence and organizational performance is moderated by the value of companies' readiness level to implement BA. This conceptual model is the basis for establishing the proposed structural equation model on business analytics implementation in the retail industry.

## METHODOLOGY

### Research design

Since the objective is to determine the relationship between the variables of the study, the strength of their correlation and the probability of predicting another variable through the value of a predictor variable, Structural Equation Modeling (SEM) is utilized (Eriksson, 2014; Waljee, Higgins, & Singal, 2014). SEM is used to explain associations, interactions, or correlations between variables by incorporating unobservable variables (e.g., latent variables) measured indirectly by indicator variables (Hair et al., 2017).

To establish the intended output of this study, the Partial Least Squares Regression – Structural Equation Model (PLS-SEM) was used to evaluate each relationship of our constructs. PLS-SEM is selected in this study since,

according to Hair, Ringle, and Sarstedt (2011), it is more appropriate to use for theory development and when the sample size is small. It is also an advantage of PLS if the data violates normality assumption because it is a non-parametric type of statistical tool. The evaluation of the measurement model and the structural model was conducted based on the PLS-SEM approach of Hair et al. (2017).

## Research data

The locale of the study is the retail companies that have been implementing any form of business analytics technology from 2016 to 2019. Retail companies are composed of Food and Non-Food firms. Since business analytics is relatively new in the Philippines, only a limited number of qualified respondents can participate. Consequently, total population sampling is utilized as an approach to enlisting participants. Laerd (2012) defines total population sampling as a technique where we choose to examine an entire but small population with a particular set of characteristics. From the prescribed characteristics, 69 retail companies who are qualified to take part in the study were identified, but only 62 companies were available to participate.

Data comes from the responses to the survey questionnaire given to the two sets of respondents – (1) Managers in charge of implementing BA technology and (2) Managers or Directors who are in charge of marketing, finance, and operations. Overall, 124 respondents (2 for each retail firm) participated in the study.

The following Table 1 showcases the profile of the respondents as they are sorted according to their organizational position, number of analysts, and years in implementing business analytics.

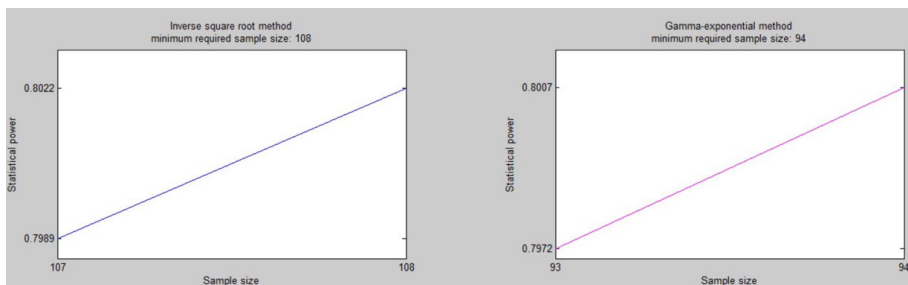
**Table 1.** Respondent's profile distribution

Characteristic	Frequency	Relative	Rank
<b>Position/Title for BA Implementers</b>			
Head/Lead Analyst	48	77.4%	1
Business Analyst	14	22.6%	2
Total for BA Implementers	62		
<b>Position/Title for Corporate Officers</b>			
Chief Information Officer	47	75.8%	1
Corporate Relations Officer	12	19.4%	2
Administration/Operations Officer	3	4.8%	3
Total for Corporate Officers	62		
<b>Total Respondents</b>	<b>124</b>		

Characteristic	Frequency	Relative	Rank
<b>Number of Analysts</b>			
1 to 10	82	66.1%	1
11 to 20	24	19.4%	2
21 to 30	12	9.7%	3
More than 30	6	4.8%	4
<b>Retail Category</b>			
Food	96	77%	1
Non-Food	28	23%	2
<b>Number of Years of BA Implementation</b>			
Less than 3	0	0%	
3 years and above	124	100%	

**Note:** 62 retail companies were represented by the 124 respondents.

With the minimum absolute significant path coefficient in the structural model of 0.216, Type I error of 0.05, and statistical power level of .80, the minimum required sample sizes are as follows: 94 for gamma exponential method and 108 for inverse square root (see Figure 2). The required minimum sample size must be between 104–117; thus, the actual sample size of 124 is sufficient enough to explain the results of the structural model.



**Figure 2.** Results of the inverse square root and Gamma-exponential method

## Research instrument

The questionnaire items are indicators intended to measure each construct or latent variable presented in the conceptual framework. Answers for each item in the questionnaire are given through a 4-point scale. Each item was evaluated using a numerical scale based on the respondent's knowledge of the variables of the research questions. For the survey questionnaire for business analysts, the items inquire about the quality or capacity of analytics infrastructure and capabilities. If this is the case, the following scale



descriptors suggested by McLeod (2019) and Boone et al. (2012) are deemed appropriate: 1 – Poor; 2 – Lacking; 3 – Good; 4 – Excellent (1st questionnaire).

The survey questionnaire for top-level managers has a list of definitive statements serving as indicators, where respondents rate statements based on the level of their agreement with each one (Hair et al., 2017). It has the following scale descriptors: 1 – Strongly disagree; 2 – Disagree; 3 – Agree; 4 – Strongly agree (2nd). All questionnaire items are shown in Table 2.

## Data gathering procedure

Two data gathering methods were used in evaluating the hypothesis: Survey strategy and Financial statement analysis. The survey was conducted in December 2019. Financial data were also inquired from the retail companies to measure their financial performance. There were separate survey questionnaires for business analytics and organizational performance. It is one of the ex-ante approaches to avoid the rampant dilemma in survey methods called the common method bias, in which only one class of respondents answers both questionnaire items for the independent and dependent variable (Chin, Thatcher, & Wright, 2012; Hair et al., 2017). In this scenario, a respondent being the sole source of information can easily taint the results of the study.

**Table 2.** Scale items per construct

Construct	Item	Items
Level of Readiness of BA Implementation	AVETSA	Technical skills level of analysts
	AVEBSA	Analytics infrastructure of the firm
	AVEBAN	Network capacity of the firm
	AVEBAI	Number of implementers and/or analysts
	AVEBAY	Years of BA implementation
Data Dashboard	DD01	Integration with third party applications
	DD02	Track progress against key customer experience and operational targets
	DD03	Organize, track and maintain CRM-related data to have a hub for managing all customer-related information helping employees prioritize workload
	DD04	Organize, track and maintain product related data to have a hub for managing all produce product-related information helping employees prioritize workload
Decision Support System	DSS01	Sensitivity analysis
	DSS02	Backward analysis sensitivity models
	DSS03	Optimization analysis
	DSS04	Forecasting models
Financial Analysis Capability	FA01	Liquidity real time report
	FA02	Leverage real time report
	FA03	Solvency real time report
	FA04	Forecasting capability
	FA05	Prescriptive capability

Construct	Item	Items
Business Process Management	BPM01	Order fulfillment
	BPM03	Logistics Management
	BPM04	Operations monitoring
	BPM05	Customer onboarding
Marketing Performance	MP01	We continue to increase our customer contacts
	MP02	We continue to increase our marketing leads
	MP03	We continue to increase our qualified sales leads
	MP04	We continue to increase our qualified product leads
Business Process Performance	BPP01	We continue to reduce Input Resources Order time
	BPP02	We continue to reduce the processing time of products
	BPP03	We continue to reduce move time
	BPP05	We continue to reduced batch processing time
Business Intelligence	BI01	We have a thorough understanding of customer preferences
	BI02	We can effortlessly cope with heightened competition through anticipation
	BI03	We can easily identify growth opportunities
	BI04	We are adept in improving our internal efficiency
	BI05	We work smarter through data-driven decisions
Organizational Performance	OP01	We consistently realize our organizational objectives
	OP02	We continue to increase the competitiveness of our products
	OP03	We continue to penetrate current and potential markets
	OP04	We are able to respond quickly to changes in trends and demands of the market

## Financial data analysis

In order to establish a high degree of accuracy in terms of financial data, analysis was also used for the financial indicators under financial performance (Table 3). Financial statements for the years ending 2016, 2017, 2018, and 2019 were requested from research participants. Some of the financial statements were downloaded from the official website of retail companies represented by the respondents that post their financial statements online (e.g., publicly listed). Other financial statements were given directly by the research participants.

**Table 3.** Numerical range from averaged index of annual growth rate evaluating financial performance

Scale	Sales	Net profit	Net worth and return on equity
1	1.17 to 1.33	1.03 to 1.06	1 to 1.03
2	1.34 to 1.41	1.07 to 1.08	1.04 to 1.05
3	1.41 to 1.48	1.09 to 1.11	1.06 to 1.08
4	Over 1.48	Over 1.11	Over 1.08

The annual growth rate was computed using the Averaged Index method to facilitate the scaling of financial performance. Each figure for the succeeding years (2017, 2018, and 2019) is divided by the base year – 2016. The pedagogic objective was to determine the increase or decrease of the financial performance by comparing it to the base year. The advantage of this method is it yields small variances, which is favorable for statistical analysis. The average annual growth rate index is then grouped into quartiles to match the 4-point numerical scale similar to the scale responses in the questionnaire to be appropriate for statistical analysis. Since the range of average indexes is different between these financial metrics (i.e., sales are higher and more varied than the net profit or return on equity), each has a different bracket for each scale point.

## **Validity and reliability test results**

### ***Content validity***

Content validity was established through the scrutiny of BA experts, managers, and research experts. The experts were requested to specify whether a questionnaire item is necessary for operating a construct in a set of items or not. To this purpose, they were requested to score each item from 1 to 4 with a four-degree range of “not necessary, useful but not essential, essential, and highly essential,” respectively (Zamanzadeh et al., 2015). Based on the content validity result for all the questionnaire items to measure the latent variables, all items passed the given standard, which is  $> 0.70$ , having a rating of either Good or Excellent. Four items were excluded having a score of  $< 0.40$ . It shows that the remaining items are good indicators of the constructs they are trying to measure.

### ***Construct validity and reliability***

In order to verify the construct validity and reliability of the survey instrument, a pilot study was conducted by inviting 25 respondents to answer the survey questionnaire. Their responses were used as raw data for the construct validity and reliability tests. These respondents were consequently excluded from the proper survey of the study to avoid the pre-testing effect (Richland, Kornell, & Kao, 2009).

Construct validity was established through convergent and divergent validity measures using confirmatory factor analysis. Based on the statistical analysis performed on the pilot test data, two items were removed due to indicator scores falling below the standard. All remaining items have factor

loadings that are statistically significant with  $p < 0.05$  (two-tailed) and are more than the minimum recommendation of Hair et al. (1987 & 2009)  $\geq 0.50$ . The average variances extracted for all the constructs are also more than 0.50, which is the minimum postulated by Fornell and Larcker (1981). Discriminant validity is established when the square root of the average of each concept is larger than the correlations with the other constructs (Fornell & Larcker, 1981). For the measure of internal consistency, all constructs have composite reliability of at least 0.90, which is considered very high, taking into account that the conservative criterion is only  $> 0.70$  (Fornell & Larcker, 1981; Nunnally & Bernstein, 1994).

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## RESULTS

### Measurement model evaluation

The validity of the measurement model should be evaluated first before the structural model can be built (Hair et al., 2012). The constructs of BA capabilities (1st order) are measured formatively while the construct of BI (2nd order), organizational performance (3rd order) up to the key performance metrics (4th order) are measured reflectively. For constructs that have been measured reflectively, the following tests are applied: (1) convergent validity through average variance extracted; (2) discriminant validity through the Fornell and Larcker index; and (3) internal consistency through composite reliability. Reflective constructs in this study are marketing performance, financial performance, business process performance, organizational performance, and business intelligence.

On the other hand, formative constructs have been evaluated based on convergent validity, collinearity between indicators, and the relevance of outer weights (Hair et al., 2017). Collinearity is measured through the Variance Inflation Factor (VIF), which should not exceed a value of 5. In order to evaluate the significance and relevance of outer weights, all indicator loadings were statistically significant (i.e.,  $p < 0.05$ ), and the  $R^2$  adjusted are  $> 0.30$  (Dijkstra & Henseler, 2015).  $R^2$  adjusted is used instead of the common  $R^2$  since it is more appropriate considering the number of indicators to avoid overestimation of variance.

**Table 4.** Loadings and cross-loadings for the reflective measurement model

Construct	Questionnaire item	MP	FP	BPP	BI	OP
Marketing Performance (MP)	MP01	<b>0.634***</b>	0.114	0.332	0.366	0.233
	MP02	<b>0.715***</b>	0.386	0.18	0.45	0.454
	MP03	<b>0.977***</b>	0.323	0.272	0.115	0.128
	MP04	<b>0.720***</b>	0.193	0.191	0.129	0.384
Financial Performance (FP)	FP01	0.426	<b>0.850***</b>	0.183	0.165	0.103
	FP02	0.376	<b>0.749***</b>	0.307	0.2	0.289
	FP03	0.424	<b>0.887***</b>	0.176	0.464	0.135
	FP04	0.47	<b>0.803***</b>	0.275	0.279	0.298
Business Process Performance (BPP)	BPP01	0.164	0.486	<b>0.785***</b>	0.406	0.177
	BPP02	0.32	0.138	<b>0.984***</b>	0.115	0.418
	BPP03	0.446	0.283	<b>0.618***</b>	0.366	0.47
	BPP05	0.363	0.131	<b>0.764***</b>	0.413	0.381
Business Intelligence (BI)	BI01	0.131	0.491	0.363	<b>0.844***</b>	0.383
	BI02	0.344	0.454	0.498	<b>0.966***</b>	0.444
	BI03	0.37	0.156	0.444	<b>0.674***</b>	0.246
	BI04	0.243	0.158	0.373	<b>0.619***</b>	0.238
	BI05	0.366	0.356	0.185	<b>0.710***</b>	0.415
Organizational Performance (OP)	OP01	0.467	0.116	0.406	0.155	<b>0.682***</b>
	OP02	0.182	0.468	0.178	0.456	<b>0.741***</b>
	OP03	0.136	0.279	0.431	0.251	<b>0.906***</b>
	OP04	0.417	0.46	0.202	0.497	<b>0.725***</b>

**Note:** The figures in bold represent the indicator loadings of the construct while those not in bold are cross-loadings. Significant at p values : \* < 0.05, \*\* < 0.01, and \*\*\* < 0.001.

Table 4 reveals that only indicators that have loadings above 0.50 were considered. Only one item (BPP04) was eliminated under the construct of BPP. Since the indicator loadings are all above 0.50, its average variance is also greater than 0.50. Further, all loadings are statistically significant. Hence, all reflective indicators laid above have convergent validity.

The results for the reflective measurement model are provided in Table 5. The composite reliability coefficient evaluates construct dependability by taking into account indicators with varying loadings. The composite reliability of all structures in the table above is greater than 0.70, indicating that they have internal consistency. To test discriminant validity, the study uses the Fornell-Larcker criterion and cross-loadings. First, according to Fornell and Larcker (1981), the square root of AVE should be greater than the correlations with other latent variables.

**Table 5.** Correlation matrix, composite reliability, and square root of average variances

Construct	CR	MP	FP	BPP	BI	OP
Marketing Performance (MP)	0.78	<b>0.77</b>				
Financial Performance (FP)	0.85	0.57	<b>0.82</b>			
Business Process Performance (BPP)	0.82	0.50	0.24	<b>0.80</b>		
Business Intelligence (BI)	0.84	0.34	0.29	0.60	<b>0.77</b>	
Organizational Performance (OP)	0.77	0.46	0.40	0.44	0.51	<b>0.77</b>

**Note:** (1) First column is CR (composite reliability); (2) Diagonal and bold figures are the square root of average variance extracted; (3) Off-diagonal elements are correlations.

It reveals that the square roots of AVEs (in bold) are higher than the correlation between constructs. Second, the loading of each indicator should be greater than all cross-loadings. Accordingly, Table 5 shows that the loadings of all indicators are greater than their cross-loadings. These results, therefore, support the fact that all the constructs have discriminative measurement capacity.

For the formative measurement model, the indicators are checked for: (1) collinearity through the variance inflation factor (VIF); and (2) significance and relevance through p-value and regression weights, accordingly.

Formatively measured constructs of this study are exhibited in Table 6. To test for the validity of these latent variables, there should be no multicollinearity issues among them and their outer regression weights should be statistically significant. It can be realized that the VIF values are not exceeding 5, which is the alarm value for multicollinearity. However, six items were removed in the construct of readiness for BA implementation due to the critical level of their VIF values.

**Table 6.** Variance inflation factor and outer regression weights

Construct	Item	VIF	Outer Weights	
Level of Readiness of BA Implementation (LRBA)	AVETSA	1.744	0.289**	
	AVEBSA	1.616	0.293***	
	AVEBAN	1.537	0.275**	
	AVEBAI	2.071	0.473***	
	AVEBAY	1.854	0.382***	
Business Analytics Capabilities	Data Dashboard (DD)	DD01	1.730	0.409***
		DD02	1.675	0.346***
		DD03	1.482	0.427***
		DD04	1.099	0.345***

Construct	Item	VIF	Outer Weights
Decision Support System (DSS)	DSS01	2.381	0.329***
	DSS02	1.905	0.317***
	DSS03	1.625	0.369***
	DSS04	1.420	0.312***
Financial Analysis Capability (FA)	FA01	1.685	0.329***
	FA02	2.112	0.230**
	FA03	1.689	0.405***
	FA04	1.800	0.245***
	FA05	1.343	0.332***
Business Process Management (BPM)	BPM01	1.866	0.402***
	BPM03	1.692	0.216***
	BPM04	1.823	0.320***
	BPM05	2.504	0.390***
	BPM06	2.708	0.478***

Note: Significant at p values: \* < 0.05, \*\* < 0.01, and \*\*\* < 0.001.

All outer weights are also statistically significant. Therefore, we can conclude that the constructs measured formatively have acceptable validity and reliability. Overall, the measurement model has good indicator reliability, construct reliability, convergent validity, and discriminant validity. As these criteria are met, the constructs can test the structural model.

### Structural model evaluation

To evaluate the structural model, the following were established based on Hair's recommendation (Hair et al., 2013): (1) collinearity assessment, (2) structural model path coefficients, (3) coefficient of determination ( $R^2$  value), (4) effect sizes ( $f^2$  and  $q^2$ ) and (5) predictive relevance ( $Q^2$ ) (Hair, Hult, Ringle, & Sarstedt, 2014; Samani, 2016). Collinearity is assessed and the results present minimal collinearity among the constructs having 2.15 as the highest VIF among explanatory variables. This means that the predictors in the structural model do not suffer from multicollinearity issues. The significance of each path coefficient is computed by means of a bootstrapping technique with 5000 iterations with  $n = 124$  (Chin, Kim, & Lee, 2013).

PLS-SEM, as proposed by Hair et al. (2017), is to be evaluated through the coefficient of determination expressed as  $R^2$  – a measure of the predictive power and through Stone-Geisser's  $Q^2$  value (Geisser, 1974; Stone, 1974) – a criterion of predictive accuracy was computed for the exogenous

constructs.  $R^2$  values of 0.75, 0.50, or 0.25 for endogenous latent variables can, as a rule of thumb used by scholarly studies, be respectively described as strong, moderate, or weak (Hair et al., 2011; Henseler et al., 2009). Furthermore, each path is evaluated through effect size. Two effect sizes are reported in this study: the effect size related to  $R^2$  expressed as  $f^2$  and the effect size related to  $Q^2$  expressed as  $q^2$ . Criteria for evaluating  $f^2$  and  $q^2$  are that values of 0.02, 0.15, and 0.35, respectively, represent small, medium, and large effects (Cohen, 1988). Effect size values of less than 0.02 indicate that there is no effect. Table 7 shows the result of path evaluation, while Table 8 shows the coefficient of determination and predictive relevance results.

**Table 7.** Structural path evaluation results

Structural Path	Path Coefficient ( $\beta$ )	t-value	$f^2$	$q^2$	Conclusion
DD $\rightarrow$ BI	0.356	3.14**	0.201	0.116	H1a supported
DSS $\rightarrow$ BI	0.412	4.61***	0.378	0.371	H1b supported
FA $\rightarrow$ BI	0.216	2.18*	0.160	0.126	H1c supported
BPM $\rightarrow$ BI	0.362	3.71***	0.360	0.355	H1d supported
BI $\rightarrow$ OP	0.508	4.57***	0.355	0.249	H2 supported
OP $\rightarrow$ MP	0.423	4.12***	0.301	0.151	H4a supported
OP $\rightarrow$ FP	0.314	3.13**	0.416	0.263	H4b supported
OP $\rightarrow$ BPP	0.461	4.77***	0.463	0.377	H4c supported

**Note:** Significant at t critical values : \*1.99 at  $p = 0.05$ , \*\*2.66 at  $p = 0.01$ , and \*\*\*3.46 at  $p = 0.001$ .

The values of  $f^2$  and  $q^2$  effects can be considered  $< 0.149$  – weak; 0.15 to 0.34 – moderated and  $\Rightarrow > 0.35$  – strong.

The results of the structural path evaluation shown in Table 6 support the acceptance of hypothesis 1 (H1) that there is indeed a significant effect of business analytics capabilities on business intelligence. It can be noted that the decision support system capability (DSS) of business analytics (BA) has the most effect among predictor variables of BI, having the largest coefficient explaining business intelligence ( $\beta = 0.412$ ;  $p < 0.001$ ). It implies that for 1 level of increase in DSS utilization, there is a high probability that the business intelligence of the firm increases by 41.2%. BA's capability to improve business processes is the second most impactful explanatory variable of BI ( $\beta = 0.362$ ;  $p < 0.001$ ). The significant effect of data dashboard capability ( $\beta = 0.356$ ;  $p < 0.01$ ) infers that it statistically increases business intelligence by 35.6%. The financial analysis capability (FA) of BA turns out to be the lowest but still a significant explanatory factor of BI ( $\beta = 0.216$ ;  $p < 0.05$ ). Every output of BA can probably increase the level of BI by 21.6%.



Hypothesis 2 (H2), which postulates the significant effect of business intelligence on organizational performance, is also evidenced ( $\beta = 0.508$ ,  $p < 0.001$ ). It indicates that for every 1 unit increase in the level of business intelligence, it predicts a positive increase of around 51% in the level of organizational performance of a firm.

Results also support hypothesis 4 (H4) that organizational performance significantly affects marketing performance, financial performance, and business process performance. Among the most positively affected by organizational performance is business process performance ( $\beta = 0.356$ ;  $p < 0.001$ ). Marketing performance ( $\beta = 0.423$ ;  $p < 0.001$ ) and financial performance ( $\beta = 0.314$ ;  $p < 0.01$ ) are also significantly increased by amplifying organizational performance.

**Table 8.** Coefficient of determination and predictive relevance of the endogenous constructs

Endogenous Constructs	R <sup>2</sup> %	Explained Variance	Q <sup>2</sup>	Predictive Relevance
Business Intelligence (BI)	68.2	High	0.502	Moderate
Organizational Performance (OP)	71.5	High	0.671	High
Marketing Performance (MP)	63.5	High	0.567	High
Financial Performance (FP)	58.8	Moderate	0.319	Moderate
Business Process Performance (BPP)	67.1	High	0.578	High

**Note:** Hair's criteria =< 0.30 – Low; 0.31 to 0.60 – Moderate; > 0.60 – High.

The goodness of fit of PLS-SEM, according to Hair et al. (2017), is based on the evaluation of the coefficient of determination and predictive relevance, which should be moderate to high. Overall, we can conclude that the structural model of amplifying organizational performance through business intelligence generated by business analytics has significant explanatory and predictive power.

The Two-Stage approach proposed by Chin et al. (2003) was used to evaluate the moderating variable – level of readiness in BA implementation. This was done by computing an interaction term (i.e., level of readiness indicators x business intelligence indicators) and determining if it is statistically significant through bootstrapping. To determine the significance of the interaction term, we ran the bootstrapping procedure with 5,000 bootstrap samples ( $n = 124$ ), using the No Sign Changes option, two-tailed testing, and the standard settings for the PLS-SEM algorithm.

**Table 9.** Moderating effect of the level of readiness of BA implementation

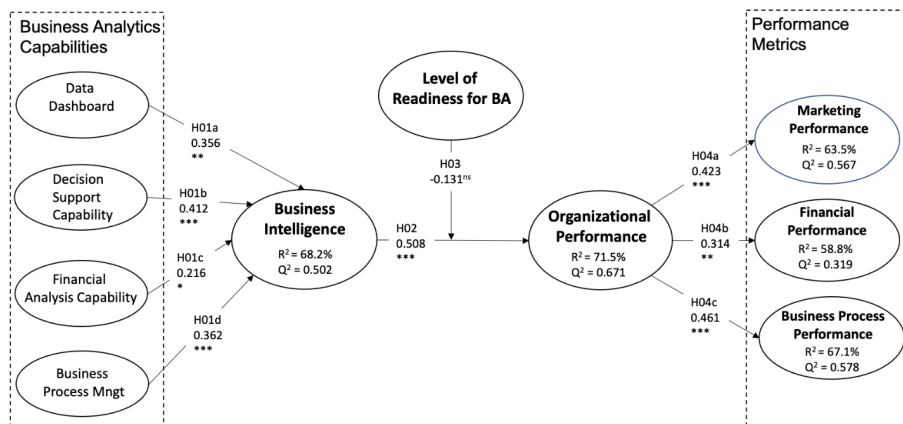
Interaction Term	<i>t</i> -value	<i>p</i> -value	Conclusion
-0.131	1.43	0.159	H4 rejected

Note: Significant at *t* critical values: \*1.99 at  $p = 0.05$ , \*\*2.66 at  $p = .01$ , and \*\*\*3.46 at  $p = 0.001$ .

The result of the moderation analysis performed using an interaction term is indicated in Table 9. Through the bootstrapping procedure, it is found that such an interaction term is not statistically significant where  $t(123) = 1.43$ ,  $p > 0.05$  is lower than the *t* critical,  $t(123) = 1.33$ ,  $p = 0.05$  causing the rejection of hypothesis 3 (H3), which states that there is a significant interaction effect of the level of readiness for business analytics implementation as a moderating variable between business intelligence and organizational performance. Accordingly, it implies that the relationship between business intelligence and organizational performance established does not change, given different levels of readiness in BA implementation.

Accordingly, this result supports Grossman and Siegel's (2014) claim that capacity or readiness to implement business analytics does not so much affect organizational performance. Thus, it negates previous studies that have shown that the relationship is influenced by the firm's infrastructure and readiness to implement analytics as a moderating factor (Wamba et al., 2015; Côte-Real et al., 2017).

Below is the established structural equation model (Figure 3) which exhibits the relationships of the constructs with their path coefficients, statistical significance, explanatory power, and predictive power.



**Figure 3.** Structural equation model of amplifying organizational performance through business intelligence

## DISCUSSION

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### Effect of business analytics capabilities on business intelligence

Based on the analysis, business analytics capabilities have a significant positive effect on the level of business intelligence (BI). This means that there is indeed a significant effect of business analytics capabilities as factors of business intelligence. It can be noted that the decision support system capability (DSS) of BA has the most effect among predictor variables of BI. This means that for 1 level of increase in DSS utilization, there is a high probability that the firm's business intelligence will increase by 41.2%. The BA capability of improving business processes (BPM) follows as the second most impactful explanatory variable of BI. This means that for 1 unit level of increase in BPM utilization, there is a high probability that the business intelligence of the firm increases by 36.2%. The significant effect of data dashboard (DD) capability infers that it statistically increases business intelligence by 35.6%. The financial analysis capability (FA) of BA turns out to be the lowest but still a significant explanatory factor of BI. Every output of FA can probably increase BI's level by 21.6%.

Business analytics capabilities indeed generate the business intelligence of a business organization. The BA capability that mostly affects business intelligence is the decision support system. This can be related to the previous fact that one of the strongest indicators of business intelligence is the firm's ability to make data-driven decisions. Another powerful BA capability that positively increases business intelligence is the business process management system. This is the reason why firms with high BI display the skill to harness internal knowledge for discovering areas for improvement in their business processes. BA's data dashboard capability provides a thorough market understanding as one of the core manifestations of BI. The BA capability in the real-time financial analysis also positively contributes to BI by providing internal knowledge in financial terms.

### Effect of organizational performance on other performance metrics

Organizational performance significantly affects other performance metrics such as marketing performance, financial performance, and business process performance. As can be viewed from the findings, organizational performance has a higher effect on business process performance and marketing performance. Every time OP increases, both the business process and marketing performance are most expected to increase subsequently. Among these performance metrics, marketing and business process

performance are more likely to increase given the similar positive increase in organizational performance.

### **Effect of business intelligence on organizational performance**

PLS-SEM results show that business intelligence is a significant predictor of the organizational performance of a retail firm. The path coefficient indicates that for every 1unit increase in the level of business intelligence, it predicts a positive increase of around 51% in the level of organizational performance. The high degree of market understanding is translated into increased market leads and a consistent increase in sales. The excellent ability to produce data-driven decisions also leads to a continuous increase in sales and net profit. Prediction of growth opportunities is manifested through the consistent increase in the return on equity. Exceptional internal knowledge of a retail firm translates to a dramatic reduction in the lead-time of input resources to order, move, process, and deliver retail products. This also concludes that the benefits that business intelligence provides for retail companies far exceed the cost of acquiring a business analytics infrastructure. Such benefits positively affect different aspects of the business organization.

### **Moderating effect of the level of readiness of business analytics implementation**

The result of the moderation analysis performed indicated that the interaction term is not statistically significant. This means that the level of readiness for BA implementation cannot be considered as a moderating factor on the relationship between business intelligence and organizational performance. The coefficient values between BI and OP do not change, given different levels of readiness in BA implementation. The level of readiness, in this case, does not affect the predictive power of BI to OP.

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## **CONCLUSION**

### **Theoretical implications**

#### ***Business intelligence amplifies organizational performance supporting the knowledge-based view of the firm***

Findings reveal that the business intelligence generated by business analytics significantly improves overall organizational performance. As a result, this confirms Grant's (1996) knowledge-based view of the Firm, which asserts

that knowledge is the most important intangible resource of a firm that aids in improving organizational performance. It was then extended by Kaplan et al. (2012) in which knowledge from internal and external sources through capabilities enhances organizational performance. In the structural equation model established, the business intelligence generated the knowledge of the firm. The business analytics capabilities represent the capabilities enhancing organizational performance. Therefore, management should focus on harnessing its knowledge from internal and external transactions to improve, consistently, organizational performance and other performance metrics such as marketing, finance, and business process.

### ***Business analytics infrastructure not significantly affecting the link between business intelligence and organizational performance***

Based on the results of the study, it was found that the level of readiness for implementing business analytics does not have a significant effect on the link between business intelligence and organizational performance. It concludes that the generation of business intelligence in amplifying organizational performance entirely depends on how business analytics capabilities are utilized. The generation of business intelligence in amplifying organizational performance does not depend, therefore, on the sophistication and the expensiveness of BA infrastructure, nor does it depend on the number of analysts.

### ***Decision support system and business process management capabilities amplifying market performance and business process performance***

Based on the proposed structural equation model on amplifying organizational performance through business intelligence, the business analytics capabilities of decision support systems and business process management capabilities are the best generators of business intelligence. Business intelligence amplifying organizational performance eventually leads to enhanced marketing performance and business process performance. Therefore, in order to improve marketing and business process performance, companies should focus their utilization of business analytics on decision support systems and business process management capabilities.

### ***Understanding business analytics generating business intelligence***

Despite potential benefits, some firms fail to capture value from the big data that flows into their company (Kaisler et al., 2013). Recent papers suggested

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research opportunities (Abbasi et al., 2016; Agarwal & Dhar, 2014), claiming that there is a need to conduct assessments of the actual impact of BA investments and use, and to understand how to achieve the benefits for organizational performance. The value chain of business analytics generating business intelligence remains relatively unexplored and requires further investigation. This study theoretically proposes and empirically validates a structural equation model based on a strategic management theory of the knowledge-based view of the firm, which considers the data or information that flows into the firm, which, if applied with business analytics, will be a source of enhanced organizational performance (Liu et al., 2014). Several pieces of literature studied business analytics and business intelligence separately as to their effects on different performance metrics (Elbashir, Collier, & Davern, 2008; Min, 2016; Aydiner et al., 2019, Akter et al., 2016; Grossman & Rinderle-Ma, 2015). This is the first study that empirically demonstrates how BA capabilities generate BI, which helps retail firms create organizational performance, leading to competitive advantage. Further studies could beneficially use this theoretical framework through the established structural equation model to assess the business value in other IT innovations at a process level and strategic level. Students, teachers, and other academics can use this paper for pedagogical support for learning about the value of business analytics and business intelligence.

## **Recommendations for future research and some limitations**

### ***Cost analysis and return on investment of business analytics***

Gathering financial data on the exact cost or investment in analytics was not part of this study. This is because relying on financial statements will not give an exact figure of capital that can be solely attributed to business analytics. Therefore, a future study can be conducted to assess the exact financial figures invested in business analytics. After arriving at the cost of infrastructure, the research can include an objective to compare it with the same returns that business analytics provide for a company.

### ***Financial metrics used in measuring the impact of business analytics***

This study supports the conclusion that financial analysis capability and financial performance are on an acceptable level but rank the lowest among other variables. It was also found that Net Worth seems not that sensitive to the business analytics effect. Therefore, it would be beneficial if further studies were conducted to identify what specific metrics should be

chosen by researchers that may accurately measure the impact of business analytics technology.

### ***Repeated measures research design of business analytics implementation***

Since this study is built on the PLS-SEM, data analysis is designed to evaluate data sets within one specific period, i.e., years included in the study are when business analytics is already being implemented. In order to determine the effect of business analytics, the average increase along the time periods was evaluated. Another exciting research that can be conducted is to ascertain the impact of business analytics through repeated measures research design. This is done by getting performance data (e.g., financial, marketing, operations) when business analytics is not yet utilized and comparing it to the gathered data from when business analytics is already being fully implemented. The objective would be to see the difference between the absence and presence of business analytics technology in its impact on any business objectives.

### ***Mediating effect of organizational performance between business intelligence and other performance metrics***

The proposed structural equation model on amplifying organizational performance through business intelligence as generated by business analytics showed that BI predicts OP, while OP predicts marketing, financial, and business process performance. OP is in the middle, which acts as mediating variable between BI and these performance metrics. To explore further this established SEM, further research can be conducted focusing only on the mediating effect of OP. Related literature may be scrutinized to substantiate the series of links between BI and OP, and OP to any of the other performance metrics.

### ***Structural model for other industries***

The locale of this study is in the retail industry. Since business analytics and business intelligence concepts are new, especially in the Philippines, future researchers' objectives can be adopted by future researchers to explore such concepts further using different industries in building their model. There is so much to learn about the impact of this technology from a different business perspective.

## Acknowledgment

This study is dedicated to the University of the City of Manila and the Analytics Association of the Philippines.

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### Abstrakt

**CEL:** *Koncepcja analityki biznesowej (BA) i business intelligence (BI) dopiero pojawia się na Filipinach. Ponieważ są to nowe koncepcje, ważne jest zbadanie ich wpływu na wydajność organizacji i wskaźniki wydajności w branży biznesowej. Celem jest zbadanie wpływu analityki biznesowej generującej business intelligence oraz jej wpływu na wydajność organizacji poprzez opracowanie modelu strukturalnego. W konsekwencji ustalono również wpływ wydajności organizacji na inne mierniki wydajności.* **METODYKA:** *Wykorzystano modelowanie metodą najmniejszych kwadratów — równania strukturalne. Zaproponowano model pokazujący, w jaki sposób business intelligence, generowany przez biznesowe BA, wpływa na wydajność organizacji, co w kon-*

sekwencji prowadzi do poprawy wydajności marketingowej, finansowej i procesów biznesowych. Przeprowadzono ankietę wśród analityków biznesowych i menedżerów wykonawczych firm detalicznych, które wdrażają BA już od co najmniej trzech lat. **WYNIKI:** Możliwości BA mają znaczący pozytywny wpływ na poziom BI. BI ma znaczący pozytywny wpływ na wydajność organizacji. Jednak wynik analizy moderacji wskazał, że poziom gotowości do wdrożenia BA nie może być uważany za czynnik moderujący związek między BI a wydajnością organizacji. **IMPLIKACJE:** Spośród różnych możliwości BA, system wspomagania decyzji i zarządzanie procesami biznesowymi okazały się najbardziej korzystnymi funkcjami w generowaniu BI. BI zwiększa wydajność organizacyjną, a w konsekwencji poprawia wydajność marketingu i procesów biznesowych w firmach detalicznych. Jednak gotowość do wdrożenia BA nie wpływa znacząco na to, jak BI poprawia wydajność organizacji. Ogólnie rzecz biorąc, zaleca się, aby w celu zwiększenia wydajności marketingu i procesów biznesowych, firmy detaliczne skupiły się na możliwościach BA systemu wspomagania decyzji i zarządzania procesami biznesowymi. **ORYGINALNOŚĆ I WARTOŚĆ:** jest to pierwsze badanie empiryczne na Filipinach, w którym oceniano wpływ analityki biznesowej i analizy biznesowej na wydajność organizacji. To badanie jest oryginalne w określaniu, jakie możliwości BA generują BI, co przekłada się na poprawę wydajności organizacji. Badanie to jest również wyjątkowe w określaniu, które kluczowe wskaźniki wydajności zostały znacznie ulepszone w wyniku jego wdrożenia. Może to służyć jako realne odniesienie dla innych badaczy zainteresowanych analityką biznesową i innymi technologiami dotyczącymi zarządzania danymi stosowanymi w operacjach biznesowych. **Słowa kluczowe:** model równania strukturalnego, podejście oparte na wiedzy, analityka biznesowa, business intelligence, wydajność organizacyjna, branża detaliczna

## Biographical note

**Emmanuel P. Paulino** finished his master's degree in Business Administration at the University of the City of Manila. He is a graduate of Bachelor of Science in Commerce major in Information Management from the University of Perpetual Help in Las Pinas, Philippines. His employment career has mostly been spent in government service, working as an IT and Database Manager and Consultant. In 2012, he started his teaching career with St. Dominic College of Asia. He took the Teaching Certificate Program while teaching at the University of Perpetual Help Molino at the Senior High School department. In September 2019, he passed the Licensure Examination for Professional Teachers. He graduated from the Doctorate Program in Business Administration at the University of the City of Manila in 2021. He is currently a faculty member of San Beda College - Alabang as a faculty in business and management, teaching different courses related to business, entrepreneurship, and research.



### **Conflicts of interest**

The author declares no conflict of interest.

### **Citation (APA Style)**

Paulino, E.E. (2022). Amplifying organizational performance from business intelligence: Business analytics implementation in the retail industry. *Journal of Entrepreneurship, Management and Innovation*, 18(2), 69-104. <https://doi.org/10.7341/20221823>

# The contribution of intellectual capital to banks' competitive and financial performance: The evidence from Poland

Monika Klimontowicz<sup>1</sup> , Justyna Majewska<sup>2</sup> 

## Abstract

**PURPOSE:** The paper aims to investigate the contribution of intellectual capital to banks' competitive and financial performance. **METHODOLOGY:** The paper uses data retrieved from a research survey. The questionnaire on IC contribution to banks' competitive performance was applied to executive managers of retail banks operating in the Polish banking market. The data collected for the assessment of financial performance were retrieved from banks' annual reports and referred to each year from 2012 to 2019. The data were analyzed by Principal Axis Factor Analysis (PAF) and Partial Least Squares Structural Equation Modelling (PLS-SEM). **FINDINGS:** The results revealed that banks' competitive and financial performance depends on both the intellectual capital and environmental factors. The relation between financial performance and intellectual capital is positively mediated by competitive performance, and environmental factors can affect the strength of this relationship. The findings show that applying the resource-based theory might not be sufficient to gain a competitive advantage and sustainable market position in the case of banks. **IMPLICATIONS:** The results develop IC knowledge and prove the necessity to conduct systematic research on their importance for creating value for customers and gaining competitive advantage. They also provide direction for banks' decision-makers concerning factors that should be taken into account to create competitive advantage, market performance, and efficiency. The Polish banking market has transformed from undeveloped and non-competitive into a developed and competitive one during the last few decades. Thus, the results also have implications for other companies operating in transition markets as their competitiveness depends on understanding which factors should be the foundation for their market strategy

1 Monika Klimontowicz, Ph.D. Hab., Department of Banking and Financial Markets, Faculty of Finance, University of Economics in Katowice, ul. 1 Maja 50, 40-287 Katowice, Poland, e-mail: monika.klimontowicz@ue.katowice.pl (ORCID: <https://orcid.org/0000-0001-9215-1938>)

2 Justyna Majewska, Ph.D., Department of Demography and Economic Statistics, Faculty of Informatics and Communication, University of Economics in Katowice, ul. 1 Maja 50, 40-287 Katowice, Poland, e-mail:justyna.majewska@ue.katowice.pl (ORCID: <https://orcid.org/0000-0001-7633-2608>)

Received 10 February 2022; Revised 7 May 2022; Accepted 10 May 2022.

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and their competitiveness and efficiency to become a developed one. **ORIGINALITY AND VALUE:** The majority of the IC research concentrate on developed countries, and very little is known about developing and transition countries that were successful on their journey. Most of the research has focused on identifying and measuring IC components and the relationship between them. Usually, the research presents the state of the art and it is based on financial reports. However, the extent to which IC impacts competitive and financial performance in banking markets has been relatively rare. To the authors' best knowledge, this is the first study to examine empirically the relationship between intellectual capital, environment, competitive performance, and efficiency in a transformed banking market in Europe, which analyses the IC contribution over a few years' perspectives.

**Keywords:** intellectual capital; competitive performance; financial performance; IC survey; principal axis factor analysis; partial least squares structural equation modeling

## INTRODUCTION

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Both academics and practitioners have already accepted the general significance of knowledge for further sustainable growth and wealth creation across all industries (OECD, 1996; Kehelwalatenna & Premaratne, 2014; Neves & Proença, 2021). The development of knowledge importance has increased the interest in managing a firm's intellectual capital (do Rosario Cabrita & Vaz, 2006). The intellectual capital (IC) is defined as a crucial factor for sustainable competitive advantage (Steward, 1997; Edvinsson & Malone, 1997; Birchall & Tovstiga, 1999; Davenport & Pruzac, 2000; Mondal & Ghosh, 2012) and value creation (Edvinsson, 1997; Lev, 2001; Shaikh, 2004; Mavridis, 2005; Phusavat & Kanchana, 2007; Walsh, Enz & Canina, 2008; Schiavone, Meles, Verdoliva & Del Giudice, 2014; Chowdhury, Rana & Azim, 2019; *Rehman, Aslam & Iqbal, 2022*). In many instances, it appears to be significant for decision-making within the firm and external stakeholders and has implications for efficiency and productivity (Alhassan & Asare, 2016; Saymeh, Arikat, Hashem & Al-Khalieh, 2021). The banking sector, in general, offers an ideal area for IC research because the business nature of the banking sector is intellectually intensive (Mavridis, 2005; Branco, Delgado, Sousa & Sá, 2011; Ahuja & Ahuja, 2012; Neves & Proença, 2021).

During the last few decades, the banking sector has changed remarkably. Systematically increasing complexity of new technology, development of information and communication techniques, economy's networking, globalization, and growth of customers' expectations combined with regulatory requirements make banks face new challenges. New categories of risk have been revealed. The global financial crisis has reminded policymakers and customers that banks are the critical players in modern economies. The

crisis showed that banks and the banking system are too important to be left to self-regulate. As a result, new regulatory requirements were implemented to ensure banks' safety and sustainability. They concern equity capital requirements, liquidity requirements, and prudential standards (Basel III - Capital Requirements Directive CRDIV, Capital Requirements Regulation CRR). Another regulation that is thought to change market condition significantly is the Payment Service Directive (PSD2), opening the market for non-bank payment service providers. Additionally, a new generation of customers has entered the market. Compared with previous generations, the digital ones behave differently in the market. It will require adjusting banks' market strategies and business models (First Data Corporation, 2010; Williams & Page, 2011; BMO Wealth Institute, 2014). Considering the disruptively changing business environment and all other external aspects influencing banks' market activity, searching factors and analyzing the IC role in enabling banks to cope with them and concurrently gain the sustainable competitive advantage, market performance, and efficiency remain relevant. Although some empirical studies have found evidence to support the role of IC in helping to create a competitive advantage in the banking industry (Mondal & Ghosh, 2012) and its relationship with financial performance (Yaseen & Al-Amarneh, 2021; Neves & Proença, 2021), to the best of our knowledge, there are only a few that measure IC using a survey (Cabrita & Bontis, 2008; Curado, 2008; Mention & Bontis, 2013). Thus, providing the empirical evidence on the contribution of IC to the dynamics of the banks' value creation process remains rare, exclusively within specific geographic regions and industries (Alhassan & Asare, 2016; Mention & Bontis, 2013; Yaseen & Al-Amarneh, 2021).

Given this background, the paper seeks to expand the literature on IC and performance from the perspective of European transition markets. Specifically, the paper investigates the contribution of IC to banks' competitive and financial performance in Poland as an example of a country that successfully transformed from a developing country into a developed one. Achieving the purpose of the paper requires answering the following research questions (RQ):

*RQ1) How strongly does the intellectual capital impact banks' competitive and financial performance?*

*RQ2) To what extent may competitive performance impact the IC influence on banks' financial performance?*

*RQ3) Do environmental factors impact the IC influence on banks' competitive and financial performance?*

*RQ4) Does the size of a bank and the length of its market activity influence the assessment of IC's influence on the financial performance?*

Based on the research questions, the corresponding hypotheses were proposed. They were falsified using the Principal Axis Factor Analysis and Partial Least Squares Structural Equation Modelling. All calculations were done in R Project for Statistical Computing.

The remainder of this paper is structured as follows: the second section presents the literature review concerning IC as a foundation for banks' competitive performance and formulates the hypothesis and conceptual model, the third section considers the research methodology and describes the data, the sample, the measurement of model variables and research methods, and the fourth section presents the empirical results and discussion. The paper concludes with summary evidence of the study and its limitations.

## LITERATURE REVIEW AND HYPOTHESIS

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Competitive performance shows a firm's ability to convert its resources into strengths (Porter, 1990; Zineldin, 1996). According to the resource-based theory, the firm's assets are the foundation for building competitiveness, market and financial performance (Hamel & Prahalad, 1990; Barney, 1991; Acur & Bititci, 2004; Cheng, Lin, Hsiao & Lin, 2010; Zubac, Hubbard & Johnson, 2010). IC and its importance as a strategic resource and a competitive factor have been widely discussed over the last few decades. Several authors defined the term (e.g., Edvinsson & Malone, 1997; Edvinsson, 1997; Lev, 2001; Phusavat & Kanchana, 2007; Neves & Proença, 2021), but no consensus emerged. The authors agree with its complex character, intangible nature, and incredible potential for creating value and building a competitive advantage for any company (Klein & Prusak, 1994; Edvinsson, 1997; Lev, 2001; Shaikh, 2004; Mavridis, 2005; Phusavat & Kanchana, 2007; Walsh, Enz & Canina, 2008; Mondal & Ghosh, 2012). Unquestionably, IC is a link between knowledge, talent, skills, creativity, innovativeness, and other resources supporting the company's effectiveness and performance. Most of the existing studies are focused on developed countries, and, therefore, there is still little knowledge about the impact of IC in developing and emerging economies (Petty & Guthrie, 2000). They are mostly conducted in Africa and Asia in the banking industry, while a few transition economies are worth exploring in the European Union. To bridge this gap, the authors decided to choose Poland as one of the forerunners among new EU members. In the banking market, the researchers usually apply selected definitions and focus on factors that influence the IC perception and IC performance or, conversely, the influence of IC or its components on different aspects of firms' performance. In this

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paper, bank's intellectual capital is defined as a strategic intangible asset that enables building a long-term sustainable competitive advantage.

There is a variety of IC typologies proposed and followed by authors. The term is extended to a complex list of components or narrowed down to just a few ones. Some scholars divide IC into human capital and structural capital (Petty & Guthrie, 2000; Joia, 2000). Another approach presents IC as three components, such as people, internal structure and external structure, corresponding to human capital (human resources, human assets), structural (organizational, infrastructure) capital, and relational (customer, client) capital (Roos & Roos, 1997; Bontis, 1998; Dzikowski, 2000; Roos, Bainbridge & Jacobsen, 2001; McElroy, 2002). Many researchers split IC into different factors and items, further associated with variables to measure market efficiency and performance (Joshi, Cahill & Sidhu, 2010; Shih, Chang & Lin, 2010). Despite the authors' research, there were just a few attempts to examine some aspects of IC in Poland. Two of them focused on human resources. The first study concerned human management as a critical indicator of business activity (Haffer & Kristensen, 2010). The second one presented the integration of human resources responding to mergers of western corporations in Poland (Łupina-Wegener, 2013). Only one referred to the banking market and aimed to present a method enabling the assessment of the competitiveness of listed banks in Poland, taking economic and intellectual capital (Anielak-Sobczak, 2022).

Curado (2008), states that IC is identified as a different concept in the banking industry. This paper illustrates three different IC components of the banking industry: human capital, internal structures, and external structures. Some authors add a fourth component connected with the influence of technology on the financial service industry (Shih, 2008). On the contrary, others use a synthetic measure to examine the IC efficiency, such as HCE, SCE and RCE (Poh, Kilicman & Ibrahim, 2018; *Rehman, Aslam & Iqbal, 2022*) or employ VAIC or other similar methods such as VAICTM to analyze the performance of banks, focusing on IC and its influence on different aspects of banks' market position (Cabrita & Vaz, 2006, Mavridis, 2005; Alhassan & Asare, 2016; Goh, 2005; El-Bannany, 2008; Al-Musali & Ismail, 2014; Singh, Sidhu, Joshi & Kansal, 2016; Mohammed & Irbo, 2018; Umanto & Atmoko, 2018; Xu, Haris & Yao, 2019; Neves & Proença, 2021; Yaseen & Al-Amarneh, 2021) or base their research on case studies (Murthy & Mouritsen, 2011; Hosseini & Owlia, 2016; Nawaz & Ohlrogge, 2022). Measuring IC using a survey is still unique (Cabrita & Bontis, 2008; Curado, 2008; Mention & Bontis, 2013). The question of what IC components are essential for building banks' competitive and financial performance is still relevant. The studies consider IC or its components in two ways: as a dependent or an independent variable. The

analysis of IC components applied in the concepts mentioned above from the perspective of a characteristic of banking products and services as well as competition in banking markets led to the conclusion that, as a strategic intangible asset that enables building a long-term sustainable competitive advantage, they should be grouped around three major categories – capital of processes, human capital, and relational capital. Analyzed together as IC, they influence both banks' competitive and financial performance (H1).

During the last few decades, banking markets have experienced turbulent changes caused by globalization, liberalization, technology development, increasing customer expectations and regulatory requirements. On the one hand, fulfilling the regulatory requirements of Basel III concerning the level of capital and liquidity has resulted in increasing costs. On the other hand, the Payment Service Directive (PSD2) has opened the market for non-bank, payment service providers and has resulted in stronger competition. Additionally, a new generation of customers has entered the market. The digital ones' purchase behavior will require adjusting banks' market strategy and business models (First Data Corporation, 2010; Williams & Page, 2011; BMO Wealth Institute, 2014). As a result, maintaining a sustainable market position becomes more and more difficult. It is especially challenging for countries like Poland, where the competition is relatively recent. Even if the first banking houses were established in the 15th century there, and a few banks established over 100 years ago are still operating in the Polish banking market, the Polish history, the loss of independence and the socialist economy resulted in a lack of competitiveness. The banks' market behavior started to change in 1989 after the introduction of a new Act of Banking that enabled the establishment of non-state banks. The market response was immediate. By the end of 1992, there were 54 domestic banks. Since then, mergers and acquisitions have become essential for gaining a more significant market share and restructuring some of them. Poland's entry into the European Union also resulted in cross-border consolidation (Klimontowicz, 2016). Today, 62 commercial banks are operating in the Polish banking market.

The number includes banks established in Poland and credit institutions established in European countries. Over half of them represent foreign capital investments. Mergers and acquisitions influence the number of banks, the sector's ownership structure, and banks' resource base (Chan, Koh & Kim, 2016) and impact market concentration (Kasman, 2010). The market structure may also impact the IC performance (El-Bannany, 2015). The most frequently used measures of banking market concentration are the Herfindahl-Hirschman index (HHI) and the concentration ratio (CR5). They are also considered as an indicator of the level of market competition. The HHI and CR5 ratios level reflect that until 2010 big banks had been

developing their operational activity slower than small and medium-size banks. Since 2010, both indexes have been growing to a small degree but systematically. The data characterizing the Polish banking market (Table 1) shows that the market concentration level is relatively low, which may create new perspectives on further consolidations. The financial markets' uncertainty, strengthened by the COVID-19 pandemic, seems to be the only barrier to large-scale mergers and acquisitions today. The economy of scale will influence the banks' efficiency. As a result, banks operating in Poland diverge in competitive performance measured by market share, market value, and innovativeness, which may affect the influence of IC on banks' financial performance (H2).

**Table 1.** The structural characteristic of the Polish banking market

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Commercial banks</b>											
Number of domestic banks	46	46	45	43	39	36	36	36	35	32	30
Number of credit institutions	18	21	21	25	28	28	27	27	28	31	32
<b>Market concentration</b>											
HHI	0.574	0.559	0.563	0.568	0.586	0.656	0.670	0.659	0.648	0.691	0.697
CR5	44.2	43.9	44.3	45.0	46.0	48.5	48.8	48.5	47.9	50.0	50.3
<b>Ownership structure</b>											
Number of domestic banks	7	6	8	7	8	8	10	12	14	13	13
Number of foreign banks	57	61	58	61	59	56	53	51	49	50	49
Share of domestic banks' capital	31.9	33.8	35.0	36.4	36,8	38.5	41.0	43.5	54,7	53,2	53,9
Share of foreign banks' capital	68.1	66.2	65.0	63.6	63.2	61.5	59.0	56.5	45,3	46,8	46,1

**Source:** Own elaboration based on NBP 2007-2020.

Answering the question of how to cope with environmental factors influencing banking business and developing market performance (obtain a competitive advantage and sustainable market position) ensuring the appropriate level of efficiency remains the current research task. In the IC research, banks' financial performance is usually measured by return on assets (ROA) (Yaseen & Al-Amarnah, 2021) and a return on equity ratio (ROE) (Musali & Ismail, 2014; Mohammed & Irbo, 2018). Competitive performance and financial performance represent the two main aspects of overall organizational performance (Kianto, Andreeva, & Pavlov, 2013). In the case of banks, the external factors (competitive environment), such as banking market conditions, other banks' competitiveness and lowering the entry barriers, are thought to be the most important among all factors influencing banks' competitive and financial performance (Özkan-Günay, Günay, & Günay, 2013; El-Bannany, 2015). As a result, the following hypothesis (H3) was formulated, stating that the competitive environment moderates the relationship between IC and banks' competitive performance as well as the competitive performance and



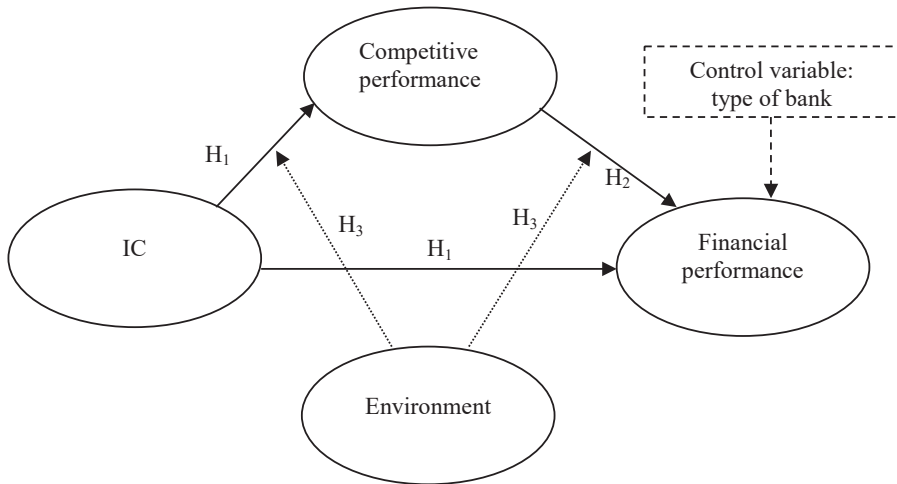
financial performance. As the financial performance measured by the average rate of ROA and ROE change, may also be influenced by the size of the bank and the length of its market activity, the last hypothesis refers to this relationship (H4). The financial performance presents how banks manage their resources to generate profits. ROA shows banks' ability to generate income using assets, while ROE assesses the financial return on a shareholder's investment. That is why those indexes are commonly used as financial performance measures (Al-Musali & Ismail, 2014; Poh, Kilicman, & Ibrahim, 2018; Soewarno & Tjahjadi, 2020; Neves & Proença, 2021; Saymeh, Arikat, Hashem, & Al-Khalieh, 2021; Nawaz & Ohlrogge, 2022).

The IC literature review and analysis of banks' competitive landscape lead to research questions and hypotheses that are the foundation of the conceptual model to investigate IC's contribution to banks' competitive and financial performance. To the authors' best knowledge, any research develops the structure of IC components from the perspective of their ability to create banks' competitive and financial performance. The conceptual model consists of the following variables:

- the independent variable: intellectual capital;
- the mediating variable: competitive performance;
- the dependent variable: financial performance;
- the moderating variable: market environment;
- the control variable: size of the bank and the length of its market activity (the type of bank)

and serves to falsify the following hypotheses that reflect the relationships between the model dimensions and variables (Figure 1):

- H1: IC has a strong direct positive impact on both banks' competitive and financial performance.*
- H2: Competitive performance affects the influence of IC on banks' financial performance.*
- H3: The competitive environment moderates the relation between the competitive performance and financial performance, as well as the relationship between IC and banks' competitive performance.*
- H4: The size of the bank and the length of its market activity influences the financial performance measured by the average rate of ROA and ROE change.*



**Figure 1.** The conceptual model

## RESEARCH METHODOLOGY

A two-step approach was implemented to test the hypotheses. The goal of the first step was to create a measurement model and obtain an acceptable fit of the data. In the second step, the structural model was statistically verified based on the measurement model found in the first step. As there is a time lag in the impact of IC on entities' performance (Kujansivu & Lönnqvist, 2007), the data on financial performance were collected over 2012-2019 from banks' annual reports.

### Measurement of variables

The development of measurement tools for the variables mentioned above was based on a generalization of the literature review. The verification of content validity employed experts' assistance to determine the contents' fitness, enhance content validity, and ensure questionnaire effectiveness. After interviews with experts, the questions were modified (Joshi, Cahill & Sidhu, 2010; Shih, Chang & Lin, 2010). Therefore, the questionnaire in the field of measuring IC and environment factors should carry a certain degree of content validity.

A set of 45 IC items was proposed to create a suitable IC measurement model. Each of them was assessed from the perspective of its role in building banks' competitive performance. The variables were made operative

according to the Likert seven-point scale (where 7 meant the highest level of importance and 1 – no importance).

The competitive performance was measured by market share, market value, and a bank's innovativeness. Klimontowicz (2016) adopted the scale developed and validated by Deshpandé, Farley and Webster (1993) and Drew (1997) and later used by Lee and Choi (2003). The original scale contains five components and aims to measure the organization's market share, growth, profits, innovativeness, and overall success against its competitors. The market share meant the relation of a bank's assets to the total assets of retail banks operating in Poland. The growth, profits, and overall success were integrated into market value. The market value refers to market capitalization obtained by multiplying the number of the bank's outstanding shares by the current share price. The innovativeness described the bank's ability to exhibit consistently innovative behavior over time, meaning three dimensions: the number of innovations adopted over time, the time of innovations' adoption, and the consistency of the adoption of innovations' time (Subramanian & Nilakanta, 1996). The executive managers assessed the bank's competitive performance in comparison with other retail banks. Each variable was measured using the Likert seven-point scale (where 7 meant being significantly better and 1 being significantly worse than competitors).

Following Al-Musali and Ismail (2014), banks' financial performance was measured by a return on assets ratio (ROA) and a return on equity ratio (ROE). ROA reflects the efficiency of utilizing available assets in creating profits and it is calculated as the annual net profit of an individual bank divided by average total assets. ROE measures bank profitability by revealing how much profit a bank generates with the money invested by shareholders. Both ratios are commonly applied as measures of financial performance in IC research (Al-Musali & Ismail, 2014; Poh, Kilicman & Ibrahim, 2018; Soewarno & Tjahjadi, 2020; Neves & Proença, 2021; Saymeh, Arikat, Hashem & Al-Khalieh, 2021; *Rehman, Aslam & Iqbal, 2022*). The impact of IC on further financial performance was measured by the average ROA and ROE change rate over 2012-2019 for each bank separately.

The environment was measured by 21 items considered essential influencers in the banking market during the last few decades. They were made operative according to the Likert seven-point scale (where 1 meant no influence on the bank, 7 – very high impact on the bank).

Following the Polish banking characteristics, for control variables, the size of the bank (Shiu, 2006; Chan, 2009; Al-Musali & Ismail, 2014; El-Bannany, 2015) and the length of market (El-Bannany, 2015) activity were used. The size of the bank was measured by the level of capital and the total assets. Some researchers chose only large banks as a sample (Curado,

2008; El-Bannany, 2008). Analysis of the Polish banking market concentration showed that the largest banks do not always have a dominant position in the market. Thus, the size of the bank may influence market performance and efficiency. Concurrently, substantial differences concerning the length of market activity characterize the banking market. Shih, Chang, and Lin (2010) focused on the banks' ownership. Their research sample included privately owned commercial banks, state-owned banks, and cooperative banks. As the vast majority of Polish banks are privately owned, there is no rationale to use ownership as a control variable in the case of the Polish banking market.

## Research methods

Structural equation modeling (SEM) was implemented to examine the conceptual model. The choice of SEM is justified because of the need to test an integrated set of dependence links, distinguish between direct and indirect effects, and account for the measurement errors of the multi-item constructs (Anderson & Gerbing, 1988).

Two steps were scoped to read the SEM model (Barclay, Higgins, & Thompson, 1995): 1) an analysis of measuring model and 2) an analysis of structural model. A measurement model represents the relationships between constructs and their corresponding indicator variables, while the structural model tests all the hypothetical dependencies based on path analysis.

Exploratory and confirmatory analyses were conducted to construct and check the reliability and validity of the proposed IC and environment measuring scales. A specific dataset, where the number of variables is higher than the number of observations, forced the search for non-classical approaches to extract IC and environment components. Therefore, the Principal Axis Factor Analysis (PAF) implemented in the high dimension molecular data (HDMD) package in the R environment was applied (McFerrin, 2013). PAF is similar to principal components analysis, but a reduced matrix where the diagonals are the commonalities is taken into account (Revelle, 2013). For data with more variables than observations, the covariance matrix is singular, and a general inverse is used to determine the inverse correlation matrix and estimate scores. In this case, the principal axis factor method of analysis allows estimating commonalities by iteratively updating the diagonal of the correlation matrix and solving the eigenvector decomposition (McFerrin, 2013). Commonalities for each variable are estimated according to the number of factors, and convergence is defined by stabilizing total commonalities between iterations.

The analysis assessed (1) the effects of IC on financial performance (both directly and indirectly, through competitive performance), (2) the

effect of IC on competitive performance (as moderated by environment), and (3) the effect of competitive performance on financial performance (as moderated by event environment). Thus, the structural model with moderated mediation effects is analyzed. In general, the moderated mediation effect indicates the presence, in a single model, of one or more mediating variables and one or more moderating variables. A moderator variable interacts with a mediator variable such that the value of the indirect effect changes depending on the value of the moderator variable (such a situation is also referred to as a conditional indirect effect) (Hair, Hult, Tomas & Ringle, 2017). A conceptual and statistical model of a conditional process can be found in Hayes (2013) (model 58). Both mediation and moderation effects are tested simultaneously using a structural equation method. A general model to test these effects is created to include all possible interactions between variables in the mediation and moderation models (MacKinnon, 2008). The PLS-SEM algorithm (The Partial Least Squares Structural Equation Modelling) was selected for estimating the relationships in a structural equation model. PLS path modeling is a soft-modeling technique with less rigid distributional assumptions on the data. Research by other authors (e.g., Goodhue, Lewis, & Thompson, 2012) indicates that PLS-SEM performs as effectively as the other techniques in detecting actual paths and not falsely detecting non-existent paths when analyzing small sample sizes or data with non-normal distributions. The structural relationships were measured using PLS-SEM bootstrapping to achieve the significance of the correlation. The number of cases used was 5000 samples for the bootstrapping procedure (Hair, Ringle, & Sarstedt, 2011).

The IC, competitive performance and market environment are modeled based on a reflective measurement model. The financial performance is a composite variable and it serves as a construct. Considering all of the above, we are dealing with the reflective-formative, the second-order hierarchical component model.

Evaluation of reflective measurement models were assessed using composite reliability (the reliability), whereas validity is evaluated using the convergent validity (average variance extracted, AVE) and discriminant validity following the Fornell-Larcker criterion. After reliability and validity are established, the primary evaluation criteria for PLS-SEM results are the coefficients of determination ( $R^2$ ) as well as the size and significance of the path coefficients. Besides the  $f^2$  effect sizes, predictive relevance ( $Q^2$ ), and the  $q^2$  effect sizes give additional insights into the quality of the model estimations (Hair, Hult, Tomas, & Ringle, 2017).

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## Data collection and sample

The dataset used to explore the research hypotheses covers 2012-2019. The empirical study on IC was conducted in 2012. The data collected for the assessment of financial performance were retrieved from banks' annual reports and referred to each year from 2012 to 2019.

The survey's target group consisted of all retail banks operating in Poland, defined as banks that offer a broad range of financial services to different segments of individual customers and fulfill all their financial needs and expectations. According to this definition, among the retail banks' features differentiating them from other banks is the broad range of distribution channels, products, and services dedicated to individuals. Their operating activity's financial sources (liabilities) are based on customers' deposits. They are primarily used in developing loans and credit products (assets). Questionnaires were spread among high-level managers responsible for organizational development, who know the bank's competencies and capabilities. The research was conducted under the auspices of the Polish Banks Association and the National Science Centre. The data was collected by two methods – PAPI (personal and pencil interviews) and CAWI (computer-assisted web interviews). 37.9% of banks' executive managers responded to the research invitation and filled in a questionnaire correctly (the total number of retail banks operating in the Polish banking market in 2012 was 29). A similar sample size was applied in other research conducted in European banking markets (e.g., Neves & Proença, 2021; Anielak-Sobczak, 2022). All the questionnaires were completed by senior (54.5% of the respondents) or middle-level (45.5%) managers.

The sample included banks established in Poland and credit institutions operating in the Polish banking market but established in European countries. The list of banks that conformed to this definition is presented in Table 2.

The number of samples is accurate for applying multiple regression analysis of the SEM-PLS model. The statistical power of the sample using Cohen's retrospective test (1992) was carried out as it was suggested in Hair, Hult, Tomas, and Ringle (2017). As the number of independent variables in the measurement and structural models is two, we need 11 observations to achieve a statistical power of 80% for detecting  $R^2$  values of at least 0.5 with a 5% probability of error.

**Table 2.** The list of retail banks operating in Poland (the target population)

Banks	
Alior Bank SA	Eurobank SA
Bank BPH SA	FM Bank SA
Bank DnB Nord Polska SA	Getin Noble Bank SA
Bank Gospodarki Żywnościowej SA	Idea Bank SA
Bank Handlowy w Warszawie (CitiHandlowy)	ING Bank Śląski SA
Bank Millenium SA	Invest Bank SA
Bank Ochrony Środowiska SA	Kredyt Bank SA
Bank Pocztowy SA	Meritum Bank ICB SA
Bank Polska Kasa Opieki SA	Nordea Bank Polska SA
Bank Polskiej Spółdzielczości SA	PKO Bank Polski SA
Bank Zachodni WBK SA	Polbank EFG SA
BNP PARIBAS SA Oddział w Polsce	Raiffeisen Bank Polska SA
BRE Bank SA	Santander Consumer Bank Polska SA
Credit Agricole Bank Polska SA	SGB Bank SA
Deutsche Bank Polska SA	

Altogether, the sample banks' assets represented 79.4% of total Polish banking sector assets. The total assets of banks that responded to the questionnaire correctly equaled PLN 561 205 million, which corresponded to 61.01% of all sample banks and 48.44% of all banks operating in the Polish banking market. The structure of the assets was as follows: 54.5% accounted for domestic capital, while 45.5% accounted for foreign capital. Such a structure corresponded to the capital structure of the Polish banking system. Over half of the banks that participated in the research were medium-sized and large banks with assets exceeding PLN 20 billion. The sample structure in terms of the value of assets is presented in Table 3.

**Table 3.** The structure of the sample in terms of the value of assets

The value of sample banks' assets (in billion)	The share in the research sample (in %)
1-5	9.1
5.1-10	9.1
10.1-20	27.3
20.1-50	18.2
over 50	36.4

The sample included banks with over a hundred years of tradition, banks established after 1989 and those found in the current century. These groups are represented evenly – 36.4% of the surveyed banks started operating before the political transformation, 27.3% in the 1990s, and 36.4% after 2000.

The sample was also diversified considering the banks' number of employees and the number of branches (Tables 4 and 5).

**Table 4.** The structure of the sample in terms of the number of employees

The number of employees (in thousands)	The share in the research sample (in %)
less than 1	9,1
1.1-5	36.4
5.1-10	18.2
Over 10	36.4

**Table 5.** The structure of the sample in terms of the number of branches

The number of branches	The share in the research sample (in %)
less than 50	9.1
51-100	9.1
101-200	9.1
201-300	9.1
301-500	27.3
over 500	36.4

Considering the retail banks' features, such as the value of assets, banks' territorial scope and business profile, the year of banks' establishment, the number of employees and branches, and persons filling in the questionnaire, the analyzed sample may be considered representative.

## RESULTS AND DISCUSSION

### The analysis of the measuring model

The factor analysis was applied to answer the question concerning IC components and their importance in creating value for customers and gaining a competitive advantage in the market (competitive performance and efficiency). The results identified three dimensions of IC and three dimensions of the environment. From 45 items designed to measure IC, 28 items remained: 12 items loaded the capital of processes, 7 items loaded human capital and 9 items loaded relational capital. Three factors of IC account for 72.3% of the item variance, with the first factor (Capital of Processes) which explains 40.7% of the total variance. The results of the factor composite reliability, Cronbach's  $\alpha$  and AVE, are superior to the limits set in the literature (i.e., Cronbach's  $\alpha \geq 0.7$ ; composite reliability  $\geq 0.7$ , AVE  $\geq 0.5$ ) (Roldán & Sánchez-Franco, 2012).



Table 6 introduces the items representing the variables and factor loadings concerning IC (only items with a factor loading at least 0.70 are considered).

**Table 6.** Reliability of measurement IC scale

Latent variables and scale items	Loading	Composite reliability	Cronbach $\alpha$	AVE
<b>Capital of Processes (PC)</b>				
The level of service modernity	0.814			
The investment in innovations	0.844			
The implementation of innovative products	0.791			
The implementation of innovative procedures	0.883			
The usage of technology in bank's management	0.821			
The investment in marketing	0.737	0.963	0.885	0.765
The number of employees	0.770			
The efficiency and timeliness of services	0.828			
The usage of traditional distribution channels	0.931			
The usage of modern distribution channels	0.884			
The safe and comfortable way of transactions authorisation	0.850			
The number of ATMs	0.841			
<b>Human Capital (HC)</b>				
The will of cooperation and knowledge sharing	0.783			
The quality of executive management	0.953			
The quality of middle level management	0.966	0.949	0.871	0.773
The level of managers' acceptance	0.936			
The quality of the motivation system	0.878			
The quality of leadership	0.926			
The knowledge of clients' needs	0.867			
<b>Relational Capital (RC)</b>				
The brand value	0.708			
The employees' knowledge and the level of education	0.804			
The employees' identification with the bank's objectives	0.894			
The level of knowledge regarding a bank and its offer	0.722	0.945	0.892	0.627
A customer-oriented attitude	0.773			
The ability to develop long-term relations with clients	0.775			
The willingness to self-development	0.872			
The level of employees' innovativeness	0.701			
The branches' organisation and working hours	0.819			

Among the three dimensions of IC identified (capital of processes, human capital, and relational capital), the capital of processes presents the highest potential for creating bank's competitive advantage. This finding does not correspond with some previous research conducted on the banking market that showed the dominance of human capital over the other IC components (e.g., Curado, 2008; Al-Musali & Ismail, 2014). But the internal structure of this IC dimension shows the importance of using technology and implementing innovations. Thus, the results correspond with studies that positively verified the relation between innovation capital and firms' performance (Shih, 2008; Tseng, Lan, Lu & Chen, 2013) and market predictions concerning customers' adoption of technology and innovations (First Data Corporation, 2010; Williams & Page, 2011; BMO Wealth Institute, 2014).

The internal structure of human capital reveals the significance of management and knowledge sharing for building banks' competitive performance. The impact of IC strategic management on value creation was also found by Kianto, Andreeva and Pavlov (2013). The findings correspond with Shih, Chang, and Lin (2010), who pointed out the importance of exchanging and sharing information in banks. It is also consistent with the conclusion that creating knowledge variety is the most critical activity in the management of IC (Schiuma & Lerro, 2008). The results proved the role of relational capital in the process of building banks' competitiveness. The internal structure of this IC corresponds with factors influencing customer loyalty in the banking sector (Skowron & Kristensen, 2012).

For the environment, 10 items remain from the original 21. The first dimension presents variables influencing the banking market conditions (5 items), the second consists of items referring to the market activity and the competitive strength of other banks (3 items) and the third one presents variables connected with entry barriers (2 items). Three dimensions of environment account for 64.9% of the total variance, with the first category explaining 30.3% of the total item variance. Table 7 introduces the environmental items representing the variables and factor loadings. The dimensions of environmental factors pointed out the importance of market conditions, the competitors' strengths and entry barriers. This result coincides with previous market-based concepts that assumed market factors as determinants of firms' competitive advantage (Porter, 1990; Acur & Bititci, 2004; Rumelt, 1991; Obłój, 2007).

**Table 7.** Reliability of the measurement environment scale.

Latent variables and scale items	Loading	Composite reliability	Cronbach alpha	AVE
<b>Banking Market Conditions (BMC)</b>		0.900	0.832	0.766
The establishment of new banks	0.727			
The situation in financial markets	0.760			
The market capacity	0.824			
The number of competitors	0.885			
The technological progress	0.747			
<b>Other Banks' Competitiveness (OBC)</b>		0.878	0.787	0.506
The competitive strength of other banks	0.871			
The level of customers' loyalty	0.839			
The competitors' pricing policy	0.810			
<b>Entry Barriers (EB)</b>		0.815	0.795	0.526
The equity relationships	0.849			
The deregulation of financial markets	0.702			

The competitive performance construct is composed of three items (market share, market value and a bank's innovativeness) with these values of indicators: Cronbach's  $\alpha = 0.85$ , composite reliability = 0.84, AVE = 0.61. All factor loadings are higher than 0.8.

As the financial performance is a composite variable, hence no quality of measurement in the actual sense of the word takes place. Discriminant validity was calculated to observe to which extent a factor indeed differs from others (Hair Jr, Sarstedt, Hopkins & Kuppelwieser, 2014). To get such results, each factor's AVE square root values were compared with the correlations between constructs associated with these factors (Fornell & Larcker, 1981). All cases (Tables 8 and 9) show values on the diagonal higher than corresponding correlations.

**Table 8.** Discriminant validity of dimensions of IC<sup>a</sup>

IC dimensions	Capital of Processes	Human Capital	Relational Capital
Capital of Processes	<b>0.875</b>		
Human Capital	0.373	<b>0.879</b>	
Relational Capital	0.491	0.300	<b>0.792</b>

Note: <sup>a</sup>AVE square root has been calculated on the diagonal (in bold).

**Table 9.** Discriminant validity of dimensions of environment <sup>a</sup>

Environment dimensions	Banking market conditions	Other Banks' Competitiveness	Entry Barriers
Banking Market Conditions	<b>0.875</b>		
Other Banks' Competitiveness	-0.050	<b>0.711</b>	
Entry Barriers	0.373	-0.109	<b>0.725</b>

Note: <sup>a</sup>AVE square root has been calculated on the diagonal (in bold).

The results mean that indicators displayed to measure the different given factors are reliable and have discriminant validity. Therefore, the analysis suggests that the scales possess composite, convergent, and discriminant validity.

### The assessment of the structural model

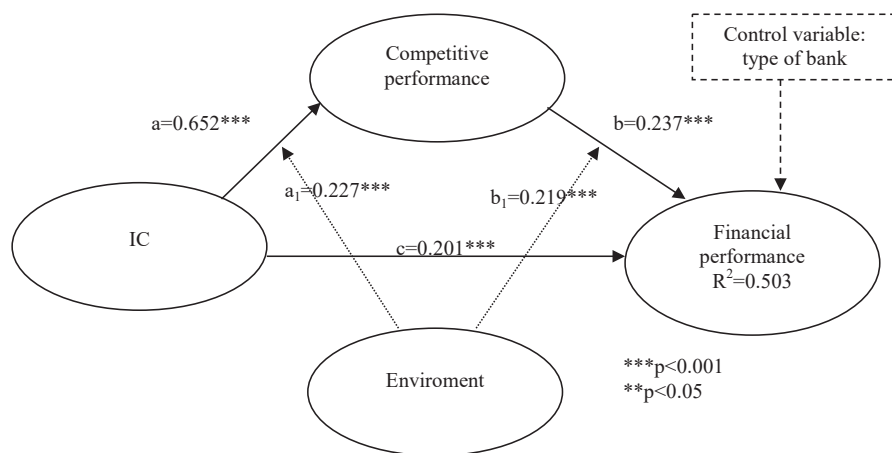
The first step of the structural model's assessment relied on verifying the direct relationship between IC and financial performance. The effect obtained is positive and significant ( $\beta=0.224$ ,  $p<0.05$ ). In the second step, the mediator effect (i.e., competitive performance) was included. This indirect effect is positive and significant (between IC and competitive performance:  $\beta=0.316$ ,  $p<0.001$ , and competitive performance and financial performance:  $\beta=0.320$ ,  $p<0.001$ ). The relationship between competitive performance and financial performance is not fully mediated according to the variance accounted for (VAF) index (Goodhue, Lewis & Thompson, 2012), resulting in a value of 0.418 (which is lower than 0.800 for total indirect effect – full mediation and higher than 0.200 for no mediation). The mediation effect did not eliminate the direct relationship between IC and financial performance. IC impacts 12.6% of the variance in competitive performance, which is quite significant, considering how many other issues affect the competitive performance of banks. The results of the structural model analysis are presented in Table 10.

The moderator effect, an environment of banks, was included in the next step to compare IC and competitive performance (first moderator effect) and the relation between competitive performance and financial performance (second moderator effect). The moderator effect of the environment is present in both relations. The moderator effect increases the explained variance of financial performance by 13%, confirming the double moderator effect of the environment of the proposed model. It is worth stressing that its absolute effect on financial performance is stronger than on competitive performance (Figure 2).

**Table 10.** Path analysis of the structural model

Path	Path coefficient Beta	R <sup>2</sup>	p-value
<b>Direct effect</b>			
IC→FP	0.224	0.049	**
<b>Mediation effect</b>			
IC→FP	0.217		**
IC→CP→FP	0.294	0.372	
IC→CP	0.316	0.126	***
CP→FP	0.320		***
<b>Conditional mediation effect</b>			
IC→FP (c)	0.201		**
IC→CP (a)	0.652		***
CP→FP (b)	0.237		**
I.C.*E→CP*E→FP		0.503	
IC*E→CP (a <sub>1</sub> )	0.227	0.145	**
C.P.*E→FP (b <sub>1</sub> )	0.219		**

Note: \*\*\*p<0.001; \*\*p<0.05.



**Figure 2.** Conditional mediation model

Considering this, the control variables (the size of the bank and the length of its market activity) are relevant and significant (coefficients are above 0.2, see Table 11).

**Table 11.** Control variables in the structural model

Variable	Beta	t-test
Size of the bank	0.310	6.102
Length of banks market activity	0.218	8.327

The statistical assessment of the conceptual model describing the contribution of IC to banks' competitive and financial performance verified the assumptions that have grown from a literature review. A summary of hypotheses is as follows (all hypotheses are confirmed):

- H1: IC positively affects competitive and financial performance. The impact of IC on financial performance explains only 4.9% of the variance of financial performance and 12.6% of the variance of competitive performance. A similar level was considered by Kianto, Andreeva, and Pavlov (2013) as quite significant, considering how many other issues affect competitive performance. The results are coherent with other studies examining the IC impact on financial performance (e.g., Neves & Proença, 2021; Yaseen & Al-Amarneh, 2021; Nawaz & Ohlrogge, 2022; *Rehman, Aslam & Iqbal, 2022*) and competitive performance measured by market share (e.g., *Rehman, Aslam & Iqbal, 2022*) although they applied research methodology.
- H2: Competitive performance has a moderator effect on the relationship between IC and financial performance. This effect leads to an increase up to 37.2% of this model's capacity to define the explained variance of financial performance.
- H3: Environment moderates positively the relationship between IC and competitive performance, as well as the relationship between competitive performance and financial performance. Findings suggest that the strength of moderation between IC and competitive performance is slightly weaker than the relationship between competitive performance and financial performance. It means that the environment plays a significant role in financial performance assessment. The created model (with competitive performance as moderator and environment as the mediator) explains 50.3% of the variance of financial performance. In the case of banks, the results show that applying the resource-based theory might not be sufficient to gain a competitive advantage and sustainable market position. Banks' financial performance depends not only on the ability to manage intangible (IC) and tangible assets but also on fulfilling regulatory requirements and managing different kinds of

risks (Holland, 2010). The impact of such external determinants of IC as a market structure was also investigated and proved by El-Bannany (2015).

- H4: The size of the bank and the length of its market activity influences the financial performance measured by the average rate of ROA and ROE change. It is coherent with previous hypothesis verification, as fulfilling regulatory requirements is strictly connected with the level of capital and assets.

## CONCLUSIONS

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The paper presents the contribution of intellectual capital to banks' competitive and financial performance. In designing the performance measurement system of the individual components of the proposed structural model, it was necessary to adjust them to specific characteristics of the banking sector. It helped find those components that can drive organizations to a higher degree of competition by improving the value creation process.

Among the three dimensions of IC identified (capital of processes, human capital, and relational capital), the capital of processes presents the highest potential for creating a bank's competitive advantage. The findings extended the knowledge on IC structure and proved the necessity to conduct systematic research on their importance for creating value for customers and gaining competitive advantage. Due to changing environmental conditions in the banking market, particular IC components' importance is changing. The dominance of human capital over the other IC components proved in previous research has not been confirmed. Today, the capacity to use technology and implement innovations seen in the capital of processes is much more critical. But still the management and knowledge sharing contribute significantly to banks' value creation and competitive performance. The results proved the role of relational capital in the process of building banks' competitiveness. The internal structure of this IC corresponds with factors influencing customer loyalty in the banking sector.

The research results pointed out the importance of market conditions, the competitors' strength, and entry barriers, which has a huge impact on the theoretical foundation of further IC research. It seems irrelevant to apply only the resource-based theory anymore. A new attitude combining both resource-based and market-based approaches is needed.

The results proved the positive IC impact on banks' competitive and financial performance. It must be stressed that the relationship between IC and financial performance is moderated by competitive performance. In

contrast, the relationship between IC and competitive performance and the relationship between competitive performance and financial performance is moderated by the environment that has practical implications for banks. Their financial performance depends not only on the ability to manage intangible (IC) and tangible assets but also on addressing the environmental challenges, such as fulfilling regulatory requirements and managing different kinds of risks. The results confirmed that the environment plays a significant role in financial performance assessment. They also pointed out that in the banking market the size of the bank (the level of capital and assets) and the length of its market activity influences the financial performance measured by the average rate of ROA and ROE change.

The long journey from a transition economy and banking market into a developed one may be an inspiration for both entities operating in other emerging and transition countries, as well as entities entering and investing in those markets. Building competitiveness and managing efficiency depend on understanding which factors should be the foundation for market strategy. The results lead to new insights for banks' decision-makers concerning factors that should be taken into account in the process of creating value for customers and gaining a competitive advantage. Shifting the importance to the capital of processes from other IC dimensions has practical implications for further technological investments. Meeting market challenges requires developing adequate managerial skills and focusing on factors that help build long-relations with customers. When making market decisions, managers should consider environmental factors that impact and strengthen the IC impact on competitive and financial performance.

This study is not free of limitations. The retrieved data cover the period from 2012 to 2019 and does not include the pandemic and Ukrainian war, which may impact the result. Thus, future research is needed to check if IC is also supporting competitive and financial performance in such an unpredictable situation. Future studies may cover other European banking markets enabling the results' comparison. Today most of the research applies the VIAC and similar methodology that makes discussing the results difficult. Thus, the above study will constitute an important point of reference for future surveys.

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### Abstrakt

**CEL:** Celem artykułu jest zbadanie wpływu kapitału intelektualnego na konkurencyjność i efektywność banków. **METODYKA:** W artykule wykorzystano dane pozyskane w wyniku badań ankietowych przeprowadzonych wśród kadry zarządzającej banków detalicznych działających na polskim rynku bankowym oraz danych wtórnych publikowanych przez NBP. Dane zostały przeanalizowane z wykorzystaniem analizy czynnikowej (Principal Axis Factor Analysis - PAF) i modelowania równań strukturalnych (Partial Least Squares Structural Equation Modeling - PLS-SEM). **WYNIKI:** Przeprowadzone analizy wykazały, że konkurencyjność i efektywność rynkowa banku zależy zarówno od kapitału intelektualnego, jak i czynników środowiskowych. Związek między efektywnością działania a jego kapitałem intelektualnym jest pozytywnie moderowany przez pozycję konkurencyjną banku, przy czym otoczenie konkurencyjne może wpływać na siłę tego związku. Uzyskane wyniki pokazują, że w przypadku banków oparcie budowania przewagi konkurencyjnej i trwałej pozycji rynkowej jedynie na zasobach banku może nie być wystarczające ze względu na specyfikę otoczenie rynkowe. **IMPLIKACJE:** Wyniki przeprowadzonych badań wskazują zarządzającym bankami jakie czynniki powinny być brane pod uwagę w procesie tworzenia przewagi konkurencyjnej, osiągania satysfakcjonujących wyników rynkowych i efektywności. W ciągu ostatnich kilkudziesięciu lat polski rynek bankowy stał się bardzo konkurencyjny, co może być inspiracją dla innych banków działających na rynkach wschodzących. Ich konkurencyjność zależy bowiem od zrozumienia, jakie czynniki powinny stanowić podstawę ich strategii rynkowej oraz ich konkurencyjności i efektywności. **ORYGINALNOŚĆ I WARTOŚĆ:** Większość badań dotyczących kapitału intelektualnego prowadzonych jest w krajach rozwiniętych. Natomiast stosunkowo niewiele wiadomo na temat krajów rozwijających się i przechodzących transformację. Ponadto większość z nich skupia się na identyfikacji i pomiarze komponentów IC oraz relacji między nimi. Badanie w jakim stopniu kapitał intelektualny wpływa na wyniki i efektywność działania banków na wschodzących rynkach bankowych są stosunkowo rzadkie. Według najlepszej wiedzy autorów jest to pierwsze badanie przeprowadzone na jednym z europejskich rynków bankowych, w którym empirycznie zbadano związek między kapitałem intelektualnym, otoczeniem konkurencyjnym oraz wynikami i efektywnością działania na przestrzeni kilku lat.

**Słowa kluczowe:** kapitał intelektualny, pozycja konkurencyjna, efektywność banków, analiza czynnikowa, modelowanie równań strukturalnych

### Biographical notes

**Monika Klimontowicz** is a professor at the University of Economics in Katowice, holding a post-PhD (habilitation) degree in Economics and Finance. Her scientific interests focus on business strategy, banking innovations,



creating value for customers, knowledge and intellectual capital, and competition in the banking market. Teaching activities include BA, MA and post-graduate courses related to banking, market strategies and competitive advantage, electronic money and payments as well as banks and non-bank entities' market behaviour (including FinTech). The results of her research are the topic of lectures delivered at domestic and foreign universities, i.e. Banku Augskola, BA School of Business and Finance in Lithuania; Turku University of Applied Sciences in Finland; Valencia University in Spain; Universite de Bretagne Occidentale in Quimper, France; Okan Universitesi in Istanbul, Turkey; the University of Alicante in Spain; Caucasus University in Tbilisi, Georgia; Polytechnic Institute of Setubal in Spain; University of Applied Sciences Würzburg-Schweinfurt in Germany; Saimaa University of Applied Sciences in Lappeenranta, Finland; VSB-TU Ostrava, Czech Republic; and Polytechnic Institute of Braganca in Portugal.

**Justyna Majewska** is an assistant professor at the University of Economics in Katowice and holds a PhD degree in Economics and Finance. Her scientific interests focus on data analysis and economic statistics including stochastic modeling of mortality and life expectancy, Robust statistics, Extreme value theory, Data Mining and Machine Learning (in R, Python, Spark, SparkR). Teaching activities include BA, MA and post-graduate courses related to scientific interests. The courses are held at domestic and foreign universities, i.e. Universite de Bretagne Occidentale in Quimper, France; Kyungpook National University: Daegu, KR; and Polytechnic Institute of Setubal in Spain.

### **Conflicts of interest**

The authors declare no conflict of interest.

### **Citation (APA Style)**

Klimontowicz, M., & Majewska, J. (2022). The contribution of intellectual capital to banks' competitive and financial performance: The evidence from Poland. *Journal of Entrepreneurship, Management and Innovation*, 18(2), 105-136. <https://doi.org/10.7341/20221824>

# Employee retention through effective human resource management practices in Maldives: Mediation effects of compensation and rewards system

Zubair Hassan<sup>1</sup> 

## Abstract

**PURPOSE:** The purpose of this study is to examine the effects of human resource management (HRM) practices on employee retention mediated by reward and compensation. Also, this study has examined the moderating role of performance appraisal, and training and development on the relationship between HRM practices and employee retention. **METHODOLOGY:** A sample of 250 respondents among the employees working in the retail sector in Capital City of Maldives was selected using the random probability sampling technique. A structured questionnaire was distributed, and data was collected. Structural equation modeling analysis was carried out to examine the causal effect of HRM practices on employee retention. **FINDINGS:** The results showed that reward and compensation (R&C) practices had significant and positive effects on employee retention. However, the study found no significant effect of career development, training and development, and performance appraisal on employee retention. In terms of mediating effects, R&C had significantly positive mediating effects on the relationship between training and development (T&D) and employee retention as well as on the relationship between performance appraisal and employee retention. However, there were no moderating effects between performance appraisal as well as T&D and employee retention. Therefore, it was concluded that increasing the positive perception towards HRM practices, particularly R&C practices in the retail sector of Maldives, causes an increase in employee retention (ER). Also, it was concluded that HRM practices such as R&C mediate the relationship between Training and Development (T&D) and Employee Retention along with the relationship between Performance Appraisal (PA) and ER. This means, indirectly PA and T&D can increase ER in the retail sector of Maldives. Similarly, we conclude that there is no moderating effect of PA and T&D in the relationship between HRM practices and ER. The overall conclusion is

1 Zubair Hassan, Ph.D. in Business Administration., Alumnae, KENMS, International Islamic University of Malaysia, Jalan Gombak, 53100, Selangor, Malaysia, e-mail: Zubai7@gmail.com (ORCID: <https://orcid.org/0000-0003-3552-3146>).

Received 30 September 2021; Revised 20 December 2021; Accepted 30 January 2022.

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that R&C has a partial mediating effect on the relationship between HRM practices and ER. **IMPLICATIONS:** This study contributes to the current knowledge of HRM by confirming that reward and compensation is a key determinant and a significant mediator for employee retention. This study contributes to developing new knowledge in the theoretical domains of HRM practices. In particular, the findings of the study strengthen Herzberg's Two-Factor theory by confirming that career growth opportunities, advancement and salary significantly determine employee retention. This showed that both motivators and hygiene factors are crucial in retaining employees. In practice, the findings also enable managers to make new organizational and HRM policy decisions on improving and enhancing employee retention. This study can be useful for organizational management to formulate effective reward and compensation policies. This study signifies the importance of training and development and performance appraisal by linking these with reward and compensation practices. **ORIGINALITY AND VALUE:** This could be one of the pioneering studies carried out in the retail sector of Maldives by examining the four constructs of human resource management practices to shed light on how retail sector business organizations in Maldives make decisions on improving employee retention. Furthermore, the current study indicated that reward and compensation have full mediating effects on the relationship between employee retention and training and development as well as performance appraisal. This filled the existing research gaps by adding value to the existing literature. Moreover, the current study adds practical values by confirming that reward and compensation should be emphasized to retain employees through other human resource management practices in the retail sector of Maldives.

**Keywords:** employee retention, rewards, compensation, training, career development, performance appraisal, human resource management, HRM

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## INTRODUCTION

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Employee retention (ER) is considered as one of the most popular researched issues in the field of human resource management (HRM). Research has revealed that a substantial number of studies have aimed to clarify the term employee retention (ER) (Cherif, 2020; Naim & Lenka, 2018; Fahim, 2018; Imna & Hassan, 2015) and further attempted to identify the key HRM practices that could have an influence on employee retention (Akther & Tariq, 2020; Sirirwardhana et al., 2019; Nabi, Ahmed, & Rahman, 2017; Imna & Hassan, 2015). Employee retention is the opposite of employee turnover, and past research has confirmed that a high level of voluntary employee turnover has negative effects on productivity and profit margins (De Winne, Marescaux, Sels, Van Beveren, & Vanormelingen, 2019) and employee performance (Afsar, Shahjehan, & Shah, 2018). Therefore, it is essential to increase employee retention among the workforces. The rate of employee

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retention implies the effectiveness of HRM practices of organizations (Abdul-Azeez, 2017). As most studies showed that a high level of employee retention has positive effects on an organization's social and economic process (Papa, Dezi, Gregori, Mueller, & Miglietta, 2018). While voluntary employee turnover has negative effects on an organization's social and economic process (De Winne et al., 2019), the importance of HRM is being appraised by increasing employee retention (Abdul-Azeez, 2017).

In the case of Maldives, the rapid changes due to COVID-19 and technological trends, have forced most Maldivian organizations to manage and utilize their resource in a sustainable manner, which poses many challenges in terms of economic and sustainable development (Suzana, Moosa, Rafeeq, & Usman, 2020). The retail food industry is considered very important, especially during COVID-19 when food supply becomes challenging. The retail food sector contributes around 7% of GDP (Suzana et al., 2020). Recent research showed that the second largest workforce in Maldives is employed in the retail industry (Van Driessche, 2020). The statistical report produced by UNDP and World Bank indicated that one of the highest employee turnover rates was found in the retail food sector of Maldives due to low pay, working conditions, lack of proper careers development and training, and this sector experiences a very low employee retention rate (Van Driessche, 2020; Imna & Hassan, 2015).

Despite the abundance of employee retention research in general, there is a lack of comprehensive studies of HRM practices on employee retention in the retail sector of Maldives. A handful of empirical, qualitative, and conceptual studies were carried out to examine the effect of HRM practices in Maldives (Najeeb, 2016; Imna & Hassan, 2015; Najeeb, 2013). The progress is observed in studies on employee retention in relation to HRM practices among employees in the tourism sector, where most of the studies found HRM practices influenced various employee behavioral outcomes such as retention, turnover, commitment, performance, and job satisfaction (Wijesiri et al., 2019; Imna & Hassan, 2015). Also, past studies that have been conducted, particularly in Maldives, lack methodological rigor in terms of the causal effect of HRM practices on employee retention. Most of the studies are conceptual, qualitative, and use a very small sample size that may not allow a generalization of the finding across industries and countries (Wijesiri et al., 2019). Only one study was found that empirically investigated the effects of HRM practices and their impact on employee retention in the retail sector of Maldives (Imna & Hassan, 2015). However, the study only partially established the link between HRM practices and employee retention.

Numerous HRM practices and related studies have been done in other parts of the world. Studies on examining the impact of HRM practices on

employee retention and other outcomes have burgeoned in the last two or three decades (Choy & Kamoche, 2021; Presbitero, Roxas, & Chadee, 2016). Differences in interpretations of responses toward HRM practices among employees vary in several ways (Santhanam et al., 2017). Most research in the past has heavily emphasised on examining how the perceived HRM practices effects employee and organisational behavioural outcomes (Aboramadan & Karatepe, 2021). The role of human resource management in employee retention and reducing voluntary turnover rates emerged in the early 20th century (Nelissen, Forrier, & Verbruggen, 2017). Indeed, much research has shown that a positive perception of HRM practices leads to high employee retention (Nelissen et al., 2017), low voluntary employee turnover (Nelissen et al., 2017), high trust in management (Afsar et al., 2018), commitment and procedural justice (Cugueró-Escofet, Ficapal-Cusí, & Torrent-Sellens, 2019), and engagement and high employee performance (Oluwatayo & Adetoro, 2020). Previous studies have demonstrated that compensation, reward, and recognition practices were the most studied HRM practice in relation to employee retention (Malik et al., 2020; Imna & Hassan, 2015), followed by training and development (Bibi et al., 2018), performance appraisal (Bibi et al., 2018), and career development (Sari & Dewi, 2020) respectively. The increasing number of empirical studies demonstrated that compensation, rewards or recognition have significantly increased employee retention rates (Rombaut & Guerry, 2020). Several studies showed training and development have a significant effect on employee retention (Sari & Nizam, 2020; Imna & Hassan, 2015) while other studies showed no significant effect on employee retention (Murtiningsih, 2020; Jehanzeb, Aldakhil, Hamid, & Khan, 2017) suggesting that past research was mixed and inconclusive. Similarly, performance appraisal in relation to employee retention was mixed (Boon, Den Hartog, & Lepak, 2019) as well as career development (Al-Ali, Ameen, Isaac, Khalifa, & Shibami, 2019; Nelissen, Forrier, & Verbruggen, 2017). This leaves a significant research gap for this study to fill in establishing the HRM practices and employee retention.

Organizations, at the heart of which lie retailers, face challenges, including complex developments such as COVID-19, technological trends, globalization and emerging competition. These fast changes impose on retailers to manage their employees effectively in employee retention and employee voluntary turnover intention. It was found that when employees were satisfied with their job, they were successfully committed to their organizations and contributed to employee retention (Mahmood, 2013). Although HRM practices have increasingly been studied in connection with different organizational outcomes like employee retention and employee performance (Rahman et al., 2013; Choi & Lee, 2013; Nadarajah et al., 2012),

no empirical research was found to be conducted on the role of HRM and employee retention mediated by compensation and rewards, particularly in the Maldives retail sector. Therefore, there exists a significant research gap.

This study has formulated the following research questions (RQ) to bridge the research gap:

*RQ1) Do HRM practices influence employee retention in the Maldivian retail sector?*

*RQ2) Do HRM practices, such as training and development, career development, and performance appraisal, influence compensation and reward practices in the Maldives retail sector?*

*RQ3) Do compensation and reward practices mediate the effect of other HRM practices on employee retention among employees in the Maldives retail sector?*

*RQ4) Does performance appraisal, and training and development, moderate the relationship between CR practices and employee retention?*

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## LITERATURE REVIEW

### Human resource management practices

The success of different organizations, large or small, such as food retailers, depends largely on the performance of employees (Uma et al., 2017), which emphasizes retaining employees with high skills and competences (Ong et al., 2019; Ong & Koh, 2018). HRM was conceived in the 1980s with a conceptual framework consisting of a number of underpinning theories (Armstrong & Taylor, 2017). Armstrong and Taylor (2017) argued that HRM practices comprise of overarching values and guiding principles to manage people in real activities, as well as HRM practices that involve developing and managing employees to ensure high performance and overseeing employee relationship. Human resource management (HRM) practices can be referred to as a set of internally coherent and consistent practices aimed at supporting and enhancing employee performance through retaining competent, committed, and motivated employees (Elrehail et al., 2019). Also, HRM practices, such as training and development, career development, performance appraisal and compensation and rewards, manage the retention of talents and skills to achieve organizations' goals (Ana et al., 2019). HRM practices are expected to create good working conditions and a positive

environment to accomplish organizations' goals where employees become highly committed to the organization by doing their best.

In previous studies, motivational theories, such as the Hierarchy of Needs and the Two-Factor theory of motivation, were used as a basis to determine the key practices of HRM that influence employee retention (Azeez, 2017). In terms of Maslow's Hierarchy of Needs theory, the motivating factors are divided into five levels (Azeez, 2017). These five levels of needs, which cause to motivate employees, are physiological, safety, love and belongings, esteem, and self-actualization (Ştefan, Popa, & Albu, 2020). The Hierarchy of Needs theory supports HRM practices such as career and development, as well as training and development along with reward and compensation (Aburumman, Salleh, Omar, & Abadi, 2020). Maslow argued that it is necessary for a lower-level need to be met and to have proceeded to a higher-level need in order to satisfy and motivate employee retention (Noltemeyer, James, Bush, Bergen, Barrios, & Patton, 2021).

Furthermore, Maslow's theoretical principles suggested that it is crucial for prepotent requirements to be satisfied before the next level needs emerge (Stefan et al., 2020). For example, having an adequate salary or wage as a part of a compensation package that enhances motivation of employees resulting in employee retention (Azeez, 2017). Similarly, rewards such as a bonus for recognizing the performance of employees enhances employee retention (Aburumman et al., 2020). Career development and growth are part of self-esteem and self-actualization needs that perfectly align with HRM practices that cause employee retention (Azeez, 2017). Therefore, HRM practices that lead to employee retention, act as motivating factors indicated by Maslow's Hierarchy of Needs theory.

Furthermore, Herzberg's Two-Factor theory, which comprises of "motivators" and "hygiene" factors that cause to improve employee retention, are well covered by HRM literature (Almaaitah, Harada, Sakdan & Almaaitah, 2017). Hygiene factors such as basic wages or salaries are factors that influence employee retention (Almaaitah et al., 2017). Under the compensation practices as a part of HRM practices, salary and wage strategies were determined and applied to influence employee turnover intention (Hanai & Pallangyo, 2020). Moreover, recognition, advancement and personal growth are considered as motivators that have significant effects on employee retention (Murtiningsih, 2020). HRM practices such as reward and compensation, career and development, as well as training and development are being applied to improve employee retention (Hanai & Pallangyo, 2020; Burnette et al., 2020). Therefore, HRM practices that were implemented in the organization to improve employee retention are well aligned with the

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Two-Factor theory (Fahim, 2018). The employees' motivation to remain in the organization is well defined by various HRM practices.

As discussed earlier in the Introduction section, HRM practices are inclusive and kept on emerging various terms in defining the key HRM practices. Differences in the interpretation of HRM practices among the employees vary in several ways (Santhanam et al., 2017). Previous studies have indicated compensation, reward and recognition practices were the most cited HRM practice in relation to employee retention (Malik et al., 2020; Imna & Hassan, 2015), followed by training and development (Bibi et al., 2018), performance appraisal (Bibi et al., 2018), and career development (Sari & Dewi, 2020) respectively. A fair proportion of available empirical studies showed that compensation, rewards, or recognition have significantly increased employee retention rates (Rombaut & Guerry, 2020).). Furthermore, several studies suggested that training and development have a significant effect on employee retention (Sari & Nizam, 2020; Imna & Hassan, 2015) while other studies showed no significant effect on employee retention (Murtiningsih, 2020; Jehanzeb, Aldakhil, Hamid, & Khan, 2017). This suggests that past research was mixed and inconclusive. Similarly, performance appraisal in relation to employee retention was mixed (Boon et al., 2019), as well as career development (Nelissen, Forrier, & Verbruggen, 2017). This leaves a significant conceptual gap for this study to fill in establishing the effect of HRM practices on employee retention.

## **Employee retention**

Several researchers have attempted to define employee retention. In the early 1990s, employee retention was defined as a process that organisations or managers use to motivate employees to stay in the organisation for long periods of time (Hom & Griffeth, 1995). Similarly, employee retention was referred to as initiatives taken by the organization to ensure employees with crucial skills and competences are prevented from leaving through appropriate compensation and rewards, supportive work environment, career development opportunities, and building employee relationship (Cascio, 2003). Employee retention was also defined as a method used by organizations to encourage employees to stay in the organization for a long term (Giri, 2008). Also, it was defined as a feeling or commitment of employees towards the organisation to stay, based on the factors that have been offered by the organization (Kurdi & Alshurideh, 2020). Alternatively, employee retention refers to those who stay with an organization due to the positive work environment, and reward and compensation that satisfy their aspiration and need (Pittino, Visintin, Lenger, & Sternad, 2016).



Employee retention is determined by many factors that are attributed to HRM practices. Some of these factors include career development, supervisor support, work environment and rewards (Khan, 2020). Strategic human resource functions such as recruitment and selection are considered as crucial elements to retain employees (Boudlaie, Mahdiraji, Shamsi, Jafari-Sadeghi, & Garcia-Pereze, 2020). The effect of HRM practices on employee retention is discussed in detail below.

## **Human resource management practices and employee retention**

The available literature on HRM practices provides an explanatory framework to shed light on how HRM practices contribute to employee retention. HRM practices such as compensation and reward, and career development, were found to have significant effects on employee retention, particularly in the retail sector of Maldives (Imna & Hassan, 2015). The most studied HRM practices in the past ten years are considered to be compensation and rewards (Aleem & Bowra, 2020; Imna & Hassan, 2015). The only study that has been carried out in Maldives showed that reward and compensation practices (R&C) cause to increase employee retention among the employees in the retail sector of Maldives (Imna & Hassan, 2015). It was also found in other contexts that R&C practices have significant and positive effects on employee retention (Hanai & Pallangyo, 2020; Khalid & Nawab 2018). This means the perceived fairness of R&C practices by the management enhances employee retention (Kalyanamitra, Saengchai, & Jermisittiparsert, 2020; Malik, Baig, & Manzoor, 2020; Hanai, & Pallangyo, 2020; Khan 2020). Thus, we propose the following hypothesis:

*H1: Reward and compensation (R&C) practices have a positive and significant effect on employee retention*

The training and development (T&D) practice is the second most researched HRM practice in relation to employee retention. Most of the studies found that T&D had significant and positive effects on employee retention (Akther, & Tariq, 2020; Fletcher, Alfes, & Robinson, 2018). Also, it was found that perceived positive T&D practice causes to reduce the intent to leave (Aburumman et al., 2020; Santhanam, Kamalanabhan, Dyaram, & Ziegler; 2017). It was argued that T&D causes to enhance job satisfaction leading to increased employee retention (Nabi, Ahmed, & Rahman, 2017). However, in the case of the Maldives retail sector, Imna and Hassan (2015) found that T&D do not have significant effects on employee retention. Most of the studies conducted in linking T&D with employee behavioral outcomes

do not cover employee retention. Similarly, much research done in the past shows that the effect of T&D on employee turnover intention (Santhanam et al., 2017) or employee retention are not significant (Murtiningsih, 2020; Jehanzeb, Aldakhil, Hamid, & Khan, 2017). Similarly, some research failed to produce sufficient evidence that T&D has any significant effect on employee retention (Wijesiri et al., 2019; Ozolina-Ozola, 2014). Equally, many studies around the world show the positive and significant effect of T&D on employee retention (Kalyanamitra, Saengchai, & Jermsittiparsert, 2020; Jeffrey & Prasetya, 2019; Boon et al., 2019) and argued that T&D must be carried out to ensure an improved employee retention rate (Aburumman et al., 2020). This shows a significant research gap in terms of knowledge and methods in producing empirical evidence to examine the effect of T&D on employee retention. Thus, we propose the following hypothesis:

*H2: Training and development (T&D) practices have a positive and significant effect on employee retention*

Third, employee career development (CD) was found to have a positive and significant effect on employee retention (Sari & Dewi, 2020; Imna & Hassan, 2015) and reduce employee turnover intention (Manthi, Kilika, & Kimencu, 2018). The research done on the retail sector of Maldives shows that when employees perceived career development practices are more positive, it has a significant and positive effect on employee retention (Imna & Hassan, 2015). Similarly, most of the research shows that enhancing CD opportunities causes to increase employee retention (Ramadhani, Muis, & Amar, 2020; Sari & Dewi, 2020). Also, some studies found that when organizations poorly practice CD, although it has a significant and negative influence on employee turnover intention (Manthi, Kilika, & Kimencu, 2018). Similarly, it was found that CD contributes most to employee retention (Mbugua & Kamaara, 2017). However, some studies showed that CD has insignificant and negative effects on employee retention (Jehanzeb et al., 2017). This means that when an organization facilitates CD opportunities for employee growth, it causes to reduce employee retention rate. There are two possible reason for such outcomes: (1) The CD opportunities are increased but only few people can access these opportunities (Ramadhani et al., 2020; Nelissen, Forrier, & Verbruggen, 2017), (2) when CD opportunities are easily available, it opens better opportunities elsewhere due to an expanding network or connection through exiting employment (Burnette et al., 2020). Due to these inconclusive and mixed results, the following hypothesis is proposed

*H3: Career development (CD) practices have a positive and significant effect on employee retention*

The fourth HRM practice is performance appraisal (PA). Many researchers have established the link between PA and employee retention. In the Maldives retail sector, it was found that PA had no significant effect on employee retention (Imna & Hassan, 2015). Similarly, research done elsewhere, found no significant effect of PA on employee retention (Boon et al., 2019). However, research done in other parts of the world showed that PA has a positive and significant effect on employee retention (Malik, Baig, & Manzoor, 2020; Aleem & Bowra, 2020; Jeffrey & Prasetya, 2019). It is clearly seen that the past research was inconclusive and produced mixed results leaving significant room to be filled by applying appropriate methods to establish the causal effect of PA on employee retention. Thus, the following hypothesis is proposed

*H4: Performance appraisal (PA) practices have a positive and significant effect on employee retention*

### **Mediating effects of reward and compensation**

Reward and compensation play a significant mediating role among other HRM practices such as PA on employee retention. Imna and Hassan (2015) argued that PA has indirect effects on employee retention through reward and compensation. Similarly, it was found that PA has a positive and significant effect on employee retention when PA is linked with reward and compensation (Kalyanamitra et al., 2020). Although there were limited studies on examining the mediating effect of reward and compensation on the relationship between HRM practices and employee retention, Riasat, Aslam and Nisar (2016) found that a reward system has significant but partial mediating effects on the relationship between intrinsic and extrinsic rewards, job performance and job satisfaction. For example, it was confirmed that reward and compensation mediated the relationship between employee involvement and job satisfaction (Bayraktar, Araci, Karacay & Calisir, 2017). Also, it was found that reward and compensation mediated the relationship between types of employee participation and employee retention (Khalid & Nawab, 2018). More recently, it was found that reward and recognition have a positive and significant impact (Rombaut & Guerry, 2020). Thus, the following hypothesis is proposed:

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*H5: Reward and compensation have a positive and significant mediating effect on the relationship between HRM practices and employee retention*

### **Moderating effects of performance appraisal**

Several studies argued that PA has an interactive role with other HRM practices and employee outcomes, such as retention, satisfaction and performance (Kalyanamitra et al., 2020; Imna & Hassan, 2015). Researchers have argued that PA moderates the causal relationship between CD and employee retention (Kalyanamitra et al., 2020). Also, it was found that PA effectiveness in moderating employee outcomes, such as affective commitment and turnover intention, depends on the perceived procedural and distributive justice of the PA process (Cugueró-Escofet et al., 2019). The appraiser should be independent, and employees perceived procedural and distributive justice of the PA process must be established in order to make the PA process effective in influencing employee outcomes (Birckcikli et al., 2016). Similarly, it was argued that PA moderated the relationship between leadership styles, such as transformation leadership behaviour and job performance (Hamid, Shah, Rahman, & Badlishah, 2020). According to Hamide et al. (2020), the significance of the moderation depends on the degree of procedural justice and fairness of the PA process in moderating the leadership style and job performance. Thus, the following hypothesis is formulated:

*H6: Performance appraisal has a positive and significant moderating effect on the relationship between HRM practices and employee retention*

### **Moderating effects of training and development**

In the past, it was found that training and development (T&D) do not have direct effects on employee retention (Imna & Hassan, 2015). However, they found that when T&D was linked with CD HRM practices, it has a positive and significant effect on employee performance. This means T&D plays an interactive role in moderating the relationship between CD practices and employee retention (Imna & Hassan, 2015). Although, there was very little or limited research that examined the moderating effects of T&D on the relationship between HRM practices of CD practices and employee retention, several studies examined the moderating effects of T&D on employee outcomes, such as motivation to learn (Kodwani & Prashar, 2019) and employee performance (Abdulhabib & Al-Dhaafri, 2019). It was found that

a trainer's reaction towards training moderates the relationship between motivation to learn and training effectiveness (Kodwani & Prashar, 2019). Also, it was found that training has significant and positive moderating effects on employee performance among IT employees (Abdulhabib & Al-Dhaafri, 2019). Similarly, T&D had a positive and significant moderating effect on the relationship between foreign technology licencing and innovation (Nguyen-Van & Chang, 2020). Another study showed that T&D significantly moderated the relationship between talent management and job satisfaction (Aruldoss, Kowalski, Travis, & Parayitam, 2021). They also found that service-oriented training moderated the relationship between talent management and organizational commitments (Aruldoss et al., 2020), such as employee turnover intention. Therefore, T&D are crucial in promoting employee career growth, reward and compensation, talent retention and enhancement to improve service quality provision to the customers to achieve organizational goals (Aleem & Bowra, 2020). Thus, the following hypothesis is proposed:

*H7: Training and development have a positive and significant moderating effect on the relationship between career development practices and employee retention*

## METHODOLOGY

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### Target population and sampling

The target population was employees working in the retail sector mainly concentrated in the Capital City of Maldives. The questionnaire was distributed among the employees through email and other social and electronic media (Facebook, Messenger, WhatsApp, and Viber) with the help of their current employers' assistance. A total of 380 questionnaires were distributed among the target population. The samples size was determined based on the items in the research instrument. The respondents were selected using a proportionate random probability sampling technique. The questionnaire had 25 items, and therefore the responses from 250 employees working in retailers located in Male' and Hulhumale city of Maldives were expected. This study managed to collect data from 272 respondents (employees from all levels in the retail stores) from 20 retailers. However, 22 respondents were eliminated from the sample due to incomplete responses. A detailed profile of the respondents is presented in Table 1.

The demographic aspects of the respondents indicated that 57.3 percent of respondents were female, and 43.8 percent of respondents were male.

This suggested that the perception of HRM practices that prevails could be influenced by the female responses. In terms of the age group of the respondents, 75.2 percent of respondents were below the age of 30 years. This indicated that the majority of the respondents who participated in the survey from the retail sector were young and dynamic employees.

**Table 1.** Profile of respondents

		Frequency	Percent	Cumulative Percent
<b>Gender</b>	Female	143	57.2	57.2
	Male	107	42.8	100.0
	Total	250	100.0	
<b>Age (years)</b>	18 - 23	103	41.2	41.2
	24 -29	85	34.0	75.2
	30 - 35	47	18.8	94.0
	>35	15	6.0	100.0
	Total	250	100.0	
<b>Marital Status</b>	Divorce	13	5.2	5.2
	Married	107	42.8	48.0
	Single	130	52.0	100.0
	Total	250	100.0	
<b>Qualification</b>	O Level	107	42.8	42.8
	A Level	89	35.6	78.4
	Undergraduate	23	9.2	87.6
	Postgraduate	5	2.0	89.6
	Professional	26	10.4	100.0
	Total	250	100.0	
<b>Tenure</b>	0 – 6 months	43	17.2	17.2
	6 -12 months	39	15.6	32.8
	1 – 2 years	54	21.6	54.4
	>2 year	114	45.6	100.0
	Total	250	100.0	
<b>Salary range (MRF)</b>	4000 - 6000	98	39.2	39.2
	7000 - 8000	64	25.6	64.8
	9000 - 11000	50	20.0	84.8
	>11,000	38	15.2	100.0
	Total	250	100.0	
<b>Job Position</b>	Junior	118	47.2	47.2
	Executive	24	9.6	56.8
	Senior	86	34.4	91.2
	Others	22	8.8	100.0
	Total	250	100.0	
<b>Department</b>	Admin	26	10.4	10.4
	Customer/Sales	118	47.2	57.6
	Human Resource	15	6.0	63.6
	Others	91	36.4	100.0
	Total	250	100.0	

Source: SPSS Output.

Generally the retention of employees is lower among the younger age groups (Pandey, Singh, & Pathak, 2021), particularly in the retail sector of Maldives. Since most of the employees participating in this survey are below 30 years, 52 percent of respondents are single. 78.4 percent of respondents attained G.C.E Ordinary Level or Advance Level certificates, which is aligned with the age group of the respondents as well as their marital status. Only 45.6 percent of respondents stayed in retail organizations for more than 2 years. This means 54.4 percent of respondents remained in the organization for less than 2 years. This retention of retail sector employees could be largely influenced by the salary range as 64.8 percent of respondents earned a salary that is below MVR 8000 (USD 519), which is a very low income compared to the current living standard of Male' City in Maldives. Furthermore, only 47.2 percent of respondents are in a junior position, justifying the age group as well as the salary range. The low salary suggested that most of the respondents are in the operational level. Moreover, only 47.2 percent of respondents are from the customer or sales department. This means the majority of the sample consists of respondents from the operational level of the organisation who are salespeople.

## Measures

The survey instrument was adapted from Imna and Hassan (2015), which was confirmed with the validity and reliability tests. The instrument consists of 25 items, 20 items represent HRM practices, while 5 items represent employee retention, as shown in Table 2. Normality of the scale was measured using kurtosis and skewness. Hair et al. (2011) argued that data is normal if skewness is between negative (-) 2 and positive (+) 2. In the SEM analysis, kurtosis values less than 3.00 in magnitude may indicate that a variable is normally distributed (Westfall & Henning, 2013). The kurtosis values in the construct for each variable is less than 3 suggesting that data is normally distributed. Furthermore, the skewness values range between -2 to 2, suggesting that the variables are normally distributed. Table 2 shows the reliability of the scale. Correlation results suggest that there is no multi collinearity

**Table 2.** Reliability and validity of items

Dimension	Variables/Factors	Loading	Reliability	AVE
<b>Career Development</b>	In my organization there is a clear structure of succession planning	0.807	0.886	0.780
	In my organization there is a clear process of identifying and planning of the workforce development to retain key talents (employees)	0.766		
	In my organization leadership development programs are conducted to prepare employee for responsibilities	0.765		
	In my organization there are structured career development plans for employees	0.806		
	In my organization there is a self-assessment process practiced that helps to choose the appropriate career	0.756		
<b>Training and Development</b>	In my organization during working hours training programs are conducted regularly	0.659	0.767	0.635
	In my organization employees are given time-off from their job to attend training programs that are conducted out-side of the organization	0.596		
	In my organization there is a routine to transfer employees from one job to another in different departments to develop skills and experience.	0.678		
	In my organization a senior employee, manager or supervisor is assigned to help, support and guide when a new employee joins to work.	0.505		
	In my organization there is a structured employee development program, such as long-term training and scholarships offerings to develop the skills and knowledge of employees	0.737		
<b>Performance Appraisal</b>	In my organization feedback is provided to employees on what is expected from the duties assigned	0.786	0.855	0.739
	In my organization there is a clear structure of two-way communication between employees and managers regarding the employee performance	0.824		
	In my organization employees and managers are directly involved in setting targets and goals, and the agreed targets will be then clearly communicated to employees	0.597		
	In my organization every year there is a performance evaluation of the employees and managers to assess we have achieved the agreed targets	0.752		
	In my organization there is a periodic review and evaluation of employees and managers performance every year or 2 years	0.736		



Dimension	Variables/Factors	Loading	Reliability	AVE
<b>Reward and Compensation</b>	In my organization financial (monetary) rewards are given for good performance	0.694	0.883	0.683
	In my organization employees who excel in their tasks are recognized (giving awards such as employee of the month or year) by celebrating the achievement of employees.	0.707		
	In my organization employees are given paid leave and paid organizational trips and other non-financial benefits	0.619		
	In my organization pay rises, bonuses and other financial rewards are offered to employees based on their performance and length of service	0.724		
	In my organization employees are given meaningful tasks along with the freedom to make their own decisions in relations to the job the employee performs	0.669		
<b>Employee Retention</b>	I am very satisfied with my organization and intend to stay with the organization	0.880	0.931	0.854
	I am very happy and comfortable with my organization	0.829		
	I have no intension to leave the organization soon	0.857		
	I will not leave this organization	0.863		
	I am very committed to this organization and I think I will never leave this organization	0.843		

Source: Adapted from Imna and Hassan (2015).

## Reliability and validity of research instrument

In terms of a test for reliability, Cronbach's Alpha values exceeded 0.7, suggesting high internal consistency between the variables. This means all the items meet the expected reliability requirements, and thus all the items were retained.

In terms of convergent validity (Table 2), Average Variance Extracted (AVE) and Confirmatory Factor Analysis (CFA) factor loadings are used to test the convergent validity. Factors loading on each item are more than 0.5, suggesting that all the items of the research instrument are convergent valid. Also, in terms of AVE of each HRM practice and employee retention in the instrument is above 0.5, suggesting that it is convergent valid.

In terms of discriminant validity (Table 3), as Hair et al. (2011) suggested, the acceptable squared correlations value should be less than 1.00. Also, the squared correlations are lower than the AVE values, suggesting that there is sufficient discriminant validity (Hair et al., 2011). Alternatively, discriminate validity can be established by using Average Variance Extracted (AVE), Maximum Shared Variance (MSV), and Average Shared Variance (ASV). In

terms of MSV, the values are higher than the AVE values of CD, R&C, and T&D. Therefore, the construct has moderate discriminant validity in terms of MSV. However, in terms of ASV, most of the AVE values in the construct are higher than the ASV value (CD= 0.641<0.780, T&D=0.675>0.635, PA=0.593<0.739, R&C=0.634<0.683, ER=0.475<0.854). This suggests that the construct has high discriminant validity.

**Table 3.** Discriminate Validity

	Correlation				
	T&D	CD	R&C	PA	ER
<b>Training and Development</b>	1	0.857	0.689	0.666	0.489
<b>Career Development</b>	0.925	1	0.593	0.654	0.458
<b>Reward and Compensation</b>	0.830	0.770	1	0.677	0.578
<b>Performance Appraisal</b>	0.816	0.809	0.823	1	0.373
<b>Employee Retention</b>	0.699	0.677	0.760	0.611	1

The squared correlation is above the diagonal (1)

Source: AMOS Output.

As per Table 3, the correlations coefficient between performance appraisal and training and development ( $r=0.816$ ), career and development ( $r=0.809$ ), and reward and compensation ( $r=0.823$ ) suggest that there could be a high chance of multicollinearity. Similarly, training and development have a high correlation coefficient with career and development ( $r=0.925$ ) and reward and compensation ( $r=0.830$ ). However, the correlation coefficient between independent variables (HRM practices) and the dependent variable (employee retention) are moderate or moderately low. Also, the collinearity statistics in terms of VIF are (CD=2.954; TD=2.822; PA= 2.612; RC=2.295) while in terms of tolerance are (CD=0.338; TD=0.354; PA=0.383 and RC=0.436). Since none of the tolerance value is less than or equal to 0.01, as well as the VIF values are below 10, this suggests that all the predictors assessing independent variables in this study, such as CD, TD, PA and RC, do not reach levels of multicollinearity (Ahmad, 2021). This means there is no multicollinearity existing among the independent variables or predictors. As confirmed by Kock (2015), if all the VIF resulting from a collinearity diagnose test are equal or less than 3.3 this suggests that the causal model is free from common method bias (CMB).

## Analysis techniques

In this research, validity was examined using convergent and discriminate validity using Confirmatory Factor Analysis via AMOS22. Reliability and normality of the scale were examined using Cronbach Alpha values via SPSS. Similarly, a normality test was carried out using skewness and kurtosis via descriptive statistical analysis. The hypothesis or casual effect of the four HRM practices was tested to examine its effect on employee retention using structural equation modeling (SEM) via AMOS. The mediating effect and moderating effect were also tested using SEM via AMOS through bootstrapping techniques.

## RESULTS

### Confirmatory factor analysis

The CFA model is (Figure 1) considered to be a good fit as it meets all the expected model fitness indices. The normed chi-square is 2.312, which, as it is below 3.0, means it meets the model fitness indices (Kline, 2016). The RMSEA value is 0.073, which is lower than the threshold of 0.08, suggesting that the model is a good fit (Hu & Bentler, 1999). The CFI scored 0.911, which is more than 0.9 and means the model fitness is achieved (Hair et al., 2011). Also, all the factors loading are above 0.5, suggesting that the model meets all the model fitness indices.

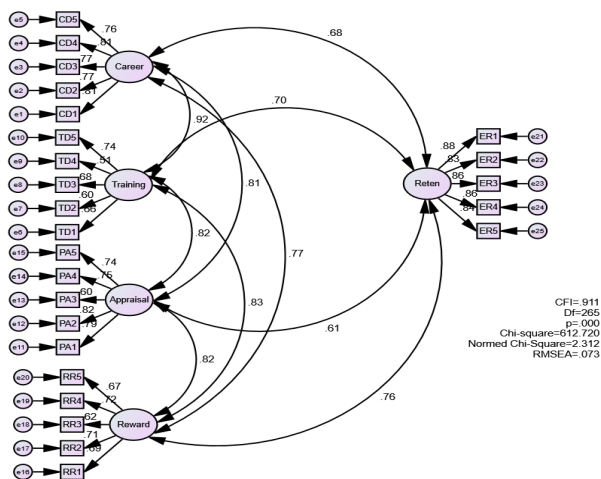


Figure 1. CFA-Measurement Model

Source: AMOS Graphics.

## Structural equation model

The structural equation model (SEM) per Figure 1 was formulated to test the hypotheses. The validity of the structural model was used to examine it in various ways. First, it was examined through the indices, such as normed chi-square, chi-square, CFI, and RMSEA (Hair et al., 2011). Chi-square was significant with  $p=0.000$  (chi-square is 612.720,  $df=265$ ). The CFI scored 0.911, which is higher than the recommended threshold value of 0.9 (Hair et al., 2011), RMSEA is 0.073, which is less than the threshold value of 0.08, Normed chi-square is 2.312, which is less than 3. Since the model meets all the fit indices, the overall SEM is a good fit model to analyze the causal effect of HRM practices on employee retention.

The SEM analysis shows that only R&C has a significant and positive effect on employee retention (coefficient=0.677,  $p=0.000$ ). Since the p-value is less than 0.05, R&C is considered to be significant, and it has a positive standardized coefficient value of 0.677. This means that a 1 (one) unit increase in R&C will cause to increase ER by 0.677 units. However, the rest of the HRM practices, such as CD, T&D and PA, have no significant effect on ER as the p-value exceeds 0.05.

## Mediating effect of reward and compensation

When adding the mediator and analyzing the mediating effect of R&C on the relationship between the rest of the HRM practices and employee retention (ER), it was found that T&D and PA have a positive and significant effect on R&C with a standardized coefficient of 0.594 ( $p=0.035$ ), and 0.460 ( $p=0.000$ ) respectively.

This means that an increase of 1 (one) unit of T&D will cause to increase 0.594 unit of R&C, while an increase in 1 (one) unit of CD will cause to increase R&C by 0.460. The study did not find any significant effect of CD on R&C. This means that by enhancing CD opportunities available in the workplace it may not directly improve the R&C received by the employees. Also, employees may not perceive or expect that they might experience any significant improvement in R&C through career growth or CD (see Figure 2).

In terms of mediating effects, the result shows that T&D and PA have a significant and positive indirect effect on ER. T&D has a positive and significant indirect effect with a standardized coefficient of 0.402 ( $p=0.035$ ), while PA has a positive and significant indirect effect with a standardized coefficient of 0.312 ( $p=0.036$ ) on ER, respectively. This means that a 1 (one) unit increase in T&D will cause to increase 0.594 unit of R&C and to increase 0.402 ( $0.594 \times 0.677$ ,  $p=0.035$ ) units of ER.

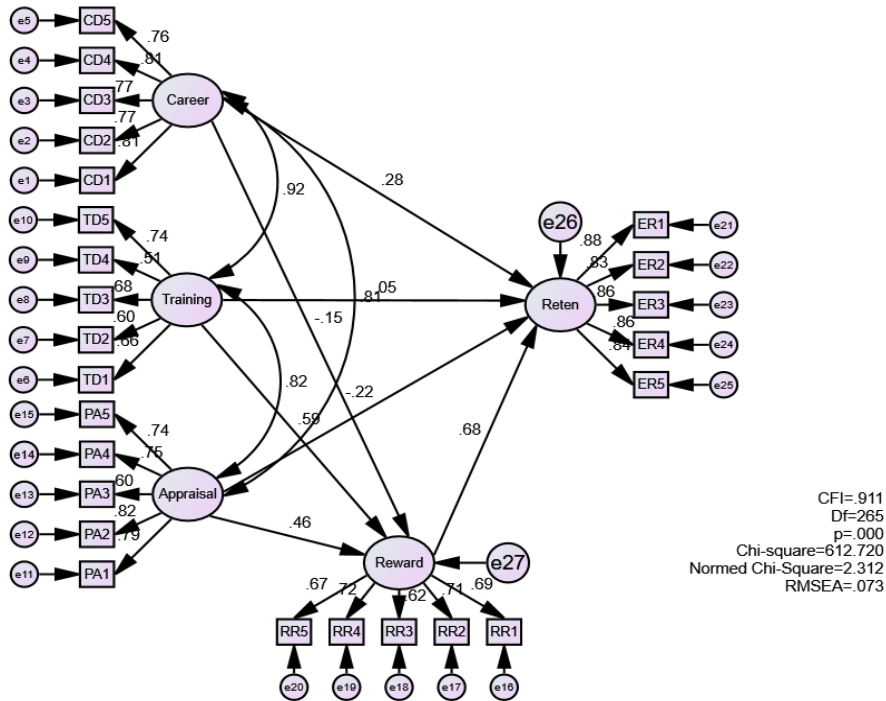


Figure 2. Direct and indirect effect of HRM practices on ER

Source: AMOS Graphics.

Furthermore, a 1 (one) unit increase in PA will increase 0.460 units of R&C, which in turn will increase ER by 0.312 units (0.460 x 0.677, p=0.036). This means R&C has a positive and significant mediating effect on the relationship between T&D and ER and, moreover, mediates the relationship between PA and ER. The current study did not find any mediating effect of R&C on the relationship between HRM practices and CD and ER (see Tables 4 and 5).

Table 4. Direct effect of HRM practices on ER

	Standardized Estimate	S.E.	C.R.	P	Hypothesis
ER <--- CD	0.284	0.265	1.162	0.245	H3
ER <--- T&D	0.053	0.396	0.177	0.860	H2
ER <--- PA	-0.218	0.155	-1.581	0.114	H4
ER <--- R&C	0.677	0.178	4.028	0.000	H1

Source: AMOS Output.

**Table 5.** Direct and indirect effect of HRM practices on ER

	Standardized Coefficient	S.E.	C.R.	P	Hypothesis
R&C <--- CD	-0.152	0.259	-0.600	0.548	H5a
R&C <--- T&D	0.594	0.355	2.106	0.035	H5b
R&C <--- PA	0.460	0.129	3.785	0.000	H5c
ER <--- CD	0.284	0.265	1.162	0.245	H3
ER <--- T&D	0.053	0.396	0.177	0.860	H2
ER <--- PA	-0.218	0.155	-1.581	0.114	H4
ER <--- R&C	0.677	0.178	4.028	0.000	H1
ER <-- R&C<--T&D	0.402	0.786	-	0.035	H5b2
ER <-- R&C<--PA	0.312	0.218	-	0.036	H5c2
ER <-- R&C<--CD	-0.103	0.527	-	0.638	H5a2

Source: AMOS Output

### Moderating effects of PA and T&D

To analyse the moderating effect, there are two principal rules. First, the independent variable, moderating variable and interactive variable must be significant in relation to the dependent variable. Second, at least the moderation variable and interactive variable must have a significant effect on the dependent variable.

The current study has analyzed PA and T&D as moderators and found that neither PA nor T&D have any moderating effect on the relationship between HRM practices and employee retention. Despite that, the interactive variable (R&C\_PA) has a significant effect on the relationship between R&C and ER, while PA does not have any significant effect on ER. Therefore, the Hypothesis (H6) is rejected. Similarly, it was found that there was no moderating effect of T&D on the relationship between CD and ER. Therefore, H7 was rejected as well.

## DISCUSSION

In general, high employee turnover in various sectors is a major issue that most organizations have been facing over the years, and this is true for Maldives. During the COVID-19 pandemic, 5% of retail sector employees have been directly affected in terms of lay-off or salaries. Many attempts were made by the organizations and government of Maldives to improve the employee retention rate, despite the increasing job hoppers around the country, particularly in the retail sector. Based on this, our research

attempted to find the effect of perceived positive HRM practices on employee retention. It was found that only reward and compensation practices have a positive and significant effect on employee retention. This means that when retailers enhance the reward and compensation practices by ensuring the transparency, procedural and distributive justice associated with the reward and compensation, it causes to increase the employee retention rate. Our findings are very similar to many past studies, such as Imna and Hassan (2015), Verma (2017) and Aleem and Bowra (2020). This means that if the organization wishes to ensure that R&C practices enhance employee retention, then it is crucial for the management to take measures to strengthen the perceived fairness of R&C practices among the employees. This will cause R&C to improve retention by enhancing distributive justice of R&C practices (Hanai & Pallangyo, 2020; Khalid & Nawab 2018). Also, R&C are key essential elements of HRM practices that directly and indirectly influence employee intention to look for new jobs or to stay in the organisation. If the organization’s R&C practices are more fair and equivalent or create more economic benefits, employees tend to stay longer in the organization by enhancing employee retention (Kalyanamitra, Saengchai & Jermisittiparsert, 2020; Malik, Baig & Manzoor, 2020; Hanai & Pallangyo, 2020). Therefore, the H1 is supported (Table 6).

**Table 6.** Acceptance and rejection of hypotheses

		Standardied Coefficient	P	Hypothesis	Acceptance and Rejection of Hypothesis
R&C	<--- CD	-0.152	0.548	H5a	Rejected
R&C	<--- T&D	0.594	0.035	H5b	Accepted
R&C	<--- PA	0.460	0.000	H5c	Accepted
ER	<--- CD	0.284	0.245	H3	Rejected
ER	<--- T&D	0.053	0.860	H2	Rejected
ER	<--- PA	-0.218	0.114	H4	Rejected
ER	<--- R&C	0.677	0.000	H1	Accepted
ER	<-- R&C<--T&D	0.402	0.035	H5b2	Accepted
ER	<-- R&C<--PA	0.312	0.036	H5c2	Accepted
ER	<-- R&C<--CD	-0.103	0.638	H5a2	Rejected

In terms of CD, T&D, and PA practices, they were found to have no significant effect on employee retention. Therefore H2, H3, and H4 are rejected. Our findings contradict the majority of similar past studies. Especially in terms of T&D, most of the past studies confirmed that by

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providing effective training that would allow employees to gain skills and competences, and enable employees to improve performance and open doors for growth causes to increase employee retention (Akther, & Tariq, 2020; Sari & Dewi, 2020). Therefore, T&D practices were used as strategies to reduce the intention to leave (Aburumman et al., 2020; Santhanam et al., 2017; Nabi et al., 2017). Similarly, the findings of many past studies were similar to our results, indicating that T&D does not have any significant effect on employee retention (Santhanam et al., 2017; Imna & Hassan, 2015) or employee retention is not significant (Murtiningsih, 2020; Wijesiri et al., 2019; Jehanzeb et al., 2017; Ozolina-Ozola, 2014). Thus, H2 could not be supported.

Similarly, the current study did not find any significant effect of career development (CD) on employee retention. Our finding is similar to many past studies, such as Sari and Dewi (2020) and Jehanzeb et al. (2017). However, our finding is contradictory to Imna and Hassan (2015), who found that employees perceived career development practices had a significant and positive effect on employee retention. Similarly, most of the research shows that enhancing CD opportunities causes to increase employee retention (Ramadhani et al., 2020; Sari & Dewi, 2020). There are many possible reasons that the current study did not find any significant effect of CD on employee retention (ER) in Maldives, one being that, due to the small society, most of the workers in various sectors are strongly connected. As a result the free flow of information about potential jobs are highly demanded in terms of better opportunities, position and rewards that encourage the existing employee leave their current job to join competitors. In the case of Maldives, the CD opportunities should be better than the competitors in order to retain talented employees; otherwise, the employee might leave the company earlier than expected (Burnetten et al., 2020; Ramadhani et al., 2020; Nelissen et al., 2017). Therefore, H4 could not be supported.

In terms of performance appraisal, the current study did not find any significant effect on employee retention (ER). Our finding is similar to past research such as Imna and Hassan (2015), where they found that PA has no significant effect on employee retention. Also, studies done by Kalyanamitra et al. (2020) found no significant effect of PA on ER. However, our finding is contradictory to some studies, such as Aleem and Bowra (2020), Jeffrey and Prasetya (2019), and Malik et al. (2020), who found that PA has a positive and significant effect on employee retention. It is not surprising that our result failed to establish the connection between PA and ER, as there is a lack of awareness about PA, especially in the private sector such as retail organizations in Maldives. PA is done very unofficially in Maldives. Despite many efforts made by the government and others, the practice of PA is very limited in the retail sector as well as in the whole country. It is argued that the PA framework in



Maldives needs to be more flexible in differentiating between high performers and low performers to instill an improvement in an employee who is slack in performance (Asim, 2001). Therefore, H4 could not be supported.

In terms of the mediating effect of reward and compensation (R&C) on the relationship between the rest of the HRM practices (PA, T&D, CD) and employee retention (ER), it was found that only R&C mediates the relationship between T&D and ER, and the relationship between PA and ER. The current study did not find any significant mediating effect of R&C on the relationship between CD and ER. Our finding is similar to previous studies done in Maldives, such as Imna and Hassan (2015), who found PA has an indirect effect on employee retention. Furthermore, studies done by Kalyanamitra et al. (2020) and Imna and Hassan (2015) found that when PA is linked with R&C, it causes to increase ER. The current study did not find the HRM practices such as PA, T&D and CD has any direct significant effects on employee retention. Therefore, the current study concluded that only R&C has a partial mediating effect on the relationship between HRM practices and ER. This is similar to studies such as Riasat et al. (2016), who found the reward system has a significant but partial mediating effect on the relationship between intrinsic & extrinsic rewards, job performance, and job satisfaction. Our finding contradicts with studies such as Khalid and Nawab (2018) as they found R&C had a significant mediating effect on employee retention along with other behaviour outcomes. Therefore, H5 could be partially supported.

In terms of moderating effect of PA and T&D, the current study did not find any significant moderating effect of PA on the relationship between HRM practices and ER as well as the moderating effect of T&D on the relationship between CD and PA. Our finding contradicts with many past studies done besides Maldives. Studies such as Kalyanamitra et al. (2020) found PA moderates the relationship between HRM practices and the behavioral outcomes of employees. In Maldives PA implementation is very limited until today. Employees' perception of the fairness associated with the PA process and outcomes is poor in Maldives. Also, employees do not see any career progression or a significant improvement in their compensation package with career development nor the performance (Asim, 2001). Hamide et al. (2020) found that the significance of the moderation depends on the degree of procedural justice and fairness of the PA process. Therefore, H6 is rejected.

In terms of the moderating effect of T&D on the relationship between CD and ER, our finding is similar to Imna and Hassan (2015) but contradicts some studies, such as Kodwani and Prashar (2019), Abdulhabib and Al-Dhaafri (2019) and Aruldoss et al. (2021), who found T&D has a significant moderating effect on the relationship between CD and employee outcomes, such as innovation, commitment, and performance. Therefore, H7 could not be supported.

Overall, the result of the study suggested that most of the respondents are significantly motivated and satisfied with their reward and compensation (R&C). This shows that most of the employees are highly motivated and satisfied with the lowest level needs in Maslow's Hierarchy of Needs. The demographic table (Table 1) suggested that most of the employees are under 30 years of age, as well as that most of them are single. Therefore, in the retail sector of Maldives, most of the employees (respondents) have an unfulfilled desire or need to be met. This is based on reward and compensation (Azeez, 2017). Furthermore, reward is a motivator in the case of Hertzberg's Two-factor theory (Azeez, 2017). This means, career development, growth and reward are consisted of to be motivators that significantly enhance employee motivation as well as satisfaction (Aburumman et al., 2020). Highly satisfied employees tend to remain in the organization (Pang & Lu, 2018).

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## CONCLUSION

Overall, it was concluded that increasing the positive perception towards HRM practices, particularly R&C practices in the retail sector of Maldives, causes to increase employee retention. Also, it was concluded that HRM practices such as R&C mediates the relationship between T&D and ER along with the relationship between PA and ER. This means, indirectly, PA and T&D can increase employee retention (ER) in the retail sector of Maldives. Similarly, it was concluded that there is no moderating effect of PA and T&D in the relationship between HRM practices and employee retention (ER). The overall conclusion is that R&C has a partial mediating effect on the relationship between HRM practices and employee retention.

The following are our recommendation to the retail sector of Maldives: (1) the retailers in Maldives, while formulating their reward and compensation policies should not only focus on the compensation package, but enhance a positive work-environment and fairness in the allocation of rewards and any increment must be based on performance, (2) the compensation package must be competitive or better than the existing ones available in the market to retain key talented staff, (3) HR managers must consider new and enticing ways to retain and motivate employees through an effective reward and compensation structure that has a wide range of benefits designed to enhance employee performance, (3) HR managers must ensure the organisation uses various methods to support the employee's education and personal development, (4) HR managers should introduce generous benefits like post-retirement medical treatment, regular promotion, and job security as tools to retain employees with key talents, (5) HR managers must

introduce a regular performance appraisal process and must take necessary actions through follow-up measures and must link R&C with the results of PA.

### **Theoretical implications**

The results of this study increase the level of understanding and knowledge about HRM practices and enable organizations to focus on ways to improve employee retention through various HRM practices. This means that by enhancing a positive perception towards HRM practices employee retention may increase. Also, this study contributes to developing new knowledge in the theoretical domains of HRM practices. The findings also enable managers to make new organizational and HRM policy decisions on improving and enhancing employee retention by improving HRM practices as well as by facilitating and guiding managers to adopt the most appropriate HRM practices.

Furthermore, the findings from this study emphasize on establishing the performance appraisal (PA) and Training and Development (T&D) system as two key determinants of reward and compensation (R&C). This study also confirms that PA and T&D have only an indirect effect on employee retention. This means the study contributes to HRM theory with new findings indicating that R&C has complete mediation on the relationship between other HRM practices and employee retention. Since many studies have been undertaken to study various aspects of HRM practices, the present study has chosen R&C, T&D, C&D and PA as a key HRM construct that is relevant to study employee retention. Since HR managers working in the retail sector of Maldives are constantly employing people from all over the country, HR managers need to link PA and T&D with R&C to make effective and efficient decisions that increase employee retention. Most retail organizations in food and other industries operating in Maldives contribute significantly to GDP growth. The food retail sector has grown bigger during past years. To ensure sustainability of these organizations, HR managers must understand the effects of HRM practices on employee retention, especially the mediating role of R&C among the employees working in the retail sector of Maldives.

The results of this study contribute to the literature on HRM and employee outcomes by providing insights into the level of employee retention in a developing country context like Maldives. Though the highly fair reward and compensation system – a combination of human resources practices intended to enhance employee retention – has been found effective in Maldives retail sector organizations, it does not always produce the same degree of positive outcomes in other national contexts. The study's findings would help in assuming that HRM is more likely to be viewed as a representation of the genuine goodwill of an employer when employees

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have more trust in management. As a result, employees should be more willing to stay in the organization. Hence, the results of this study can assist HR managers in gaining a better understanding of the benefits of employee retention, as well as how to best use HRM practices.

### **Practical implications**

The findings of this study emphasize the need for a practical approach when managing employees' perceptions of HRM practices in improving employee retention through reward and compensation (R&C). When an organization demonstrates its commitment to employees by putting in place favourable HRM, these actions may be well interpreted by the employees. This study provides evidence to enhance the belief that organizations can increase employee retention through reward and compensation policies and practices when their HRM is well understood by their employees. Such insight may enrich HRM theories, providing support for the employee outcomes of HRM as well as recognizing HRM as a key determinant of employee retention. Moreover, the study's findings corroborate the arguments that R&C mediates the relationship between HRM and employee, showing that R&C is a mediator between HRM (PA and T&D) and employee retention.

The findings of this study enable HRM professionals to realize that PA and T&D do not work separately. To make PA and T&D enhance employee retention, it is important to ensure appropriate reward and compensation (R&C) policies are formulated and implemented. This means that when employees are given training, they may not be willing to stay in the organization unless, HR managers provide sufficient R&C to increase the employees' intention to stay. The findings of this study provide Maldives' retail organizations with a concrete understanding of HRM practices and their applicability in the retail sector for an improved economy. Rigorous implementation of high commitment HRM practices may accompany better employee retention. The results suggest that retail management must concentrate more on commitment-focused HRM to make employees stay instead of leaving after gaining skills through training.

### **Limitations and future research directions**

This study has some limitations. First, although the study used a random probability sampling method, it only selected respondents from 10 organizations in the Capital City of Male. Therefore, the findings of the study have limited generalizability. Second, as a cross-sectional study, there has to be caution in making any generalization of the results. Future researchers should

get more respondents from wider geographical locations, i.e., from different retail sectors, including private and public retailers in other cities. Furthermore, survey questionnaires were used to collect data from respondents. Moreover, to overcome the potential issues raised due to the research instruments, a multicollinearity test was performed and ensured that the instrument is free from common method bias. It is recommended that future researchers use other intensive methods such as personal or telephone interviews to collect data. Hopefully, this empirical study will create greater awareness and interest in conducting more such studies in other nations and cultures and contribute to the literature on international HRM.

## Acknowledgment

This research is not sponsored by any institution. The research for this publication was fully carried out by the researcher and independently.

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### Abstrakt

**CEL:** Zbadanie wpływu praktyk zarządzania zasobami ludzkimi (ZZL) na utrzymanie pracowników za pośrednictwem nagród i wynagrodzeń. Zbadano również moderującą rolę oceny wyników, szkoleń i rozwoju i ich związku z praktykami ZZL a utrzymaniem pracowników. **METODYKA:** Próba 250 respondentów spośród pracowników zatrudnionych w sektorze handlu detalicznego w stolicy Malediwów została dobrana metodą losowej próby. Rozesłano ustrukturyzowany kwestionariusz i zebrano dane. Przeprowadzono analizę modelowania równań strukturalnych w celu zbadania wpływu przyczynowego praktyk ZZL na retencję pracowników. **WYNIKI:** Wyniki pokazały, że praktyki nagradzania i wynagradzania (R&C) miały znaczący i pozytywny wpływ na utrzymanie pracowników. Jednak badanie wykazało, że rozwój kariery, szkolenia i rozwój oraz ocena wyników nie miały znaczącego wpływu na utrzymanie pracowników. Jeśli chodzi o efekty pośredniczące, R&C miało znacząco pozytywny wpływ pośredniczący na związek między szkoleniem i rozwojem (T&D) a zatrzymaniem pracowników, a także na związek między oceną wyników a zatrzymaniem pracowników. Nie zaobserwowano jednak moderujących efektów między oceną wyników a T&D i utrzymaniem pracowników. W związku z tym stwierdzono, że zwiększenie pozytywnego postrzegania praktyk ZZL, zwłaszcza praktyk R&C w sektorze detalicz-

nym Malediwów, powoduje wzrost retencji pracowników (ER). Stwierdzono również, że praktyki ZZL, takie jak R&C, pośredniczą w relacji między szkoleniem i rozwojem (T&D) a utrzymaniem pracowników, a także relacją między oceną wyników (PA) a ER. Oznacza to, że pośrednio PA i T&D mogą zwiększyć ER w sektorze detalicznym Malediwów. Podobnie dochodzimy do wniosku, że nie ma moderującego efektu PA i T&D w relacji między praktykami ZZL a ER. Ogólny wniosek jest taki, że R&C ma częściowy wpływ mediacyjny na relacje między praktykami ZZL a ER. **IMPLIKACJE:** Niniejsze badanie przyczynia się do poszerzenia aktualnej wiedzy na temat ZZL, potwierdzając, że wynagrodzenie jest kluczowym wyznacznikiem i znaczącym mediatorem utrzymania pracowników. Niniejsze badanie przyczynia się do rozwijania nowej wiedzy w teoretycznych domenach praktyk ZZL. W szczególności wyniki badania wzmocniają teorię dwóch czynników Hertzberga, potwierdzając, że możliwości rozwoju kariery, awans i wynagrodzenie znacząco determinują utrzymanie pracowników. To pokazało, że zarówno motywatory, jak i czynniki higieniczne mają kluczowe znaczenie dla zatrzymania pracowników. W praktyce wyniki pozwalają również menedżerom na podejmowanie nowych decyzji dotyczących organizacji i polityki zarządzania zasobami ludzkimi w zakresie poprawy i zwiększenia retencji pracowników. Badanie to może być przydatne dla kierownictwa organizacji do formułowania skutecznych polityk nagradzania i wynagrodzeń. Badanie to wskazuje na znaczenie szkolenia i rozwoju oraz oceny wyników poprzez powiązanie ich z praktykami nagradzania i wynagradzania. **ORYGINALNOŚĆ I WARTOŚĆ:** Może to być jedno z pionierskich badań przeprowadzonych w sektorze detalicznym na Malediwach poprzez zbadanie czterech konstrukcji praktyk zarządzania zasobami ludzkimi, aby rzucić światło na sposób, w jaki organizacje biznesowe sektora detalicznego na Malediwach podejmują decyzje dotyczące poprawy retencji pracowników. Co więcej, obecne badanie dostarcza ram teoretycznych, które wskazują, że wynagrodzenie i nagradzanie mają pełny wpływ pośredniczący na związek między utrzymaniem pracowników a szkoleniem i rozwojem, a także oceną wyników. Wypełniło to istniejące luki badawcze, dodając wartość do istniejącej literatury. Co więcej, obecne badanie potwierdza, że należy położyć nacisk na nagradzanie i nagradzanie, aby zatrzymać pracowników poprzez inne praktyki zarządzania zasobami ludzkimi w sektorze detalicznym Malediwów.

**Słowa kluczowe:** utrzymanie pracowników, nagrody, wynagrodzenia, szkolenia, rozwój kariery, ocena wyników, zarządzanie zasobami ludzkimi, ZZL

## Biographical note

**Zubair Hassan** is an author, researcher, and a certified trainer currently associated with Pneumatic Private Limited as Director of Business Development as well as Alumnae of International Islamic University of Malaysia. He has recently completed his PhD in Business Administration from International Islamic University. He was the former Dean of International University of Malaya Wales (IUWM). Also, he held the Head of Centre of professional and continuing education at IUWM. He has won many research awards in various research conferences held in Malaysia and was recognized

and awarded the Presidential Award for his academic excellence in Maldives in 2006. He has an educational background in public policy and management from Monash University in Australia and has many publications in national and international journals. His areas of interest are marketing, leadership, organizational behavior and multiple intelligence theory, entrepreneurship, human resource, service quality, and teaching methods.

### **Conflicts of interest**

The author declares no conflict of interest.

### **Citation (APA Style)**

Hassan, Z. (2022). Employee retention through effective human resource management practices in Maldives: Mediation effects of compensation and rewards system. *Journal of Entrepreneurship, Management and Innovation*, 18(2), 137-173 <https://doi.org/10.7341/20221825>



# New insights on employee adaptive performance during the COVID-19 pandemic: Empirical evidence from Indonesia

Ronny Tan<sup>1</sup> , Ferdi Antonio<sup>2</sup> 

## Abstract

**PURPOSE:** This study investigates how perceived e-leadership and the teleworking output are linked to employee adaptive performance. Further, it seeks to comprehend whether a sense of purpose and organizational commitment have a mediating role. This study proposes a new research model that is empirically tested to predict employee adaptive performance, especially during remote working due to the COVID-19 pandemic. **METHODOLOGY:** A quantitative survey was conducted in August 2021. Respondents were obtained from 271 teleworkers employed in a reputable private company operating in the financial industry in Indonesia. The data was collected by a questionnaire using a Likert-type scale and then analyzed using PLS-SEM. **FINDINGS:** Three antecedents are proven to affect employee adaptive performance directly: organizational commitment, followed by teleworking output, and a sense of purpose. Perceived e-leadership affects employee adaptive performance indirectly, and it is mediated through teleworking output, organizational commitment, and sense of purpose. **IMPLICATIONS:** This insight suggests that management must take care of intrinsic motivation to get the employees performing in the organization. These constructs will play significant roles and, therefore, should be well-planned, well-executed, and seriously measured to strengthen employee adaptive performance in an organization. The research model result shows moderate predictive accuracy strength with medium predictive relevance on employee adaptive performance, giving opportunities to re-use and extend the research model and explore other constructs. Based on the findings, management needs to focus on trust in employees, team motivation, and employee-experience management activities to keep the employees

1 Ronny Tan, S.Si., Student at Graduate School of Management, Universitas Pelita Harapan, The Plaza Semanggi, Jl. Jend. Sudirman No.50, RT.1/RW.4, Karet Semanggi, Kecamatan Setiabudi, Kota Jakarta Selatan, DKI Jakarta 12930, Indonesia, e-mail: tanronny@yahoo.com (ORCID: <https://orcid.org/0000-0003-0442-0996>).

2 Ferdi Antonio, Ph.D., M.M., M.A.R.S., Assistant Professor at Graduate School of Management, Universitas Pelita Harapan, The Plaza Semanggi, Jl. Jend. Sudirman No.50, RT.1/RW.4, Karet Semanggi, Kecamatan Setiabudi, Kota Jakarta Selatan, DKI Jakarta 12930, Indonesia, e-mail: ferdi.antonio@gmail.com (ORCID: <https://orcid.org/0000-0002-1319-3732>).

Received 1 November 2021; Revised 9 January 2022, 29 January 2022; Accepted 7 February 2022.

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engaged. **ORIGINALITY AND VALUE:** *This is one of the first studies to deploy intrinsic motivation as an antecedent of employee adaptive performance, together with the perceived e-leadership and teleworking output. Corporations will be able to focus on some key areas that are proven to impact employee adaptive performance positively.*

**Keywords:** *e-leadership, teleworking, sense of purpose, organizational commitment, employee adaptive performance, COVID-19, intrinsic motivation*

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## INTRODUCTION

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*“Pervasive technology and data, and talent in the digital age are already the two key underlying trends shaping the workforce of the future. The additional remote working trend will complicate the shaping of the future workplace even further.” (BCG and Verizon, 2020)*

Teleworking, particularly working from home, has been around for a long time. It denotes a more adaptable working style not constrained by time, venue, or interaction method. Teleworking requires technological, social, and organizational support, as well as e-leadership practices. Following the pandemic of COVID-19, social distancing, defined as a purposeful physical distance between people (Prin & Bartels, 2020), was adopted as an effective preventative method, mandating remote working. Information and Communication Technologies (ICT) enable people to operate from any location and at any time. In addition, teleworking is also a subject of continual controversy due to the unclear non-work and work boundaries, the individual and social implications of not being physically present in the office, and the risks and advantages of flexible working (Contreras et al., 2020). Socially isolated staff also get disengaged from their regular work environment, resulting in lessened performance and continuous disheartening (Wojcack et al., 2016).

As the business and working environment becomes more dynamic to predict, employees' capacity and agility to manage the changes and the work dynamics become required abilities. Because of this, adaptive performance, described as employees' ability to adapt to agile work environments, has gained attention to understand the vibrant nature of employee performance. Adaptive performance can drive encouraging outcomes, for instance, improved performance capability and a successful career (Shoss et al., 2012). It also leads to organizational benefits, such as better change management, organizational learning ability, and conformity to evolving customer expectations (Dorsey et al., 2010). Various research was done in the past to study further the antecedents of adaptive performance, namely, the impact of servant leadership on adaptive performance (Kaya & Karatepe, 2020), extraversion and adaptive performance (Wihler et al., 2017), work ethic,

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work behavior, and adaptive performance (Javed et al., 2017). The following antecedents of adaptive performance were also studied: learning agility and adaptive performance (Lim et al., 2017), personality and work engagement fit and adaptive performance (Shahidan, 2019), inclusive leadership and adaptive performance (Yu, 2020), empowerment practices and adaptive performance (Huntsman et al., 2021). However, study on intrinsic motivation, especially on the sense of purpose and organizational commitment, and their significance to adaptive performance is challenging to find; this leads to the research gap that the author is keen to explore.

Individual purpose can act as guidance during times of crisis, supporting individuals in confronting and navigating uncertainty more effectively. Additionally, it mitigates the detrimental consequences of chronic stress. People with a firmer sense of purpose are more resilient and recover from unfavorable circumstances quickly (Schaefer et al., 2013). Purpose can significantly impact the work experience, associated with greater employee engagement, dedication to the organization, and human emotions. Individuals, who align their purpose with their work, experience more meaning in their roles, increasing their productivity and likelihood to exceed their colleagues. According to a McKinsey & Company study, employees' purposefulness correlates positively with their company's EBITDA margin (Dhingra et al., 2020). Employee adaptability has become increasingly vital for many organizations as the nature of work has changed, necessitating the ability to deal with uncertain competitive conditions and constant technological advancement (Charbonnier-Voirin & Roussel, 2012). Individually, adaptive performance can result in beneficial results, such as increased performance capability and job success (Shoss et al., 2012). Organizational commitment is correlated with several positive outcomes, including the advancement of job performance, motivation, participation, and organizational behaviors (Jacobs, 2008; Jønsson & Jeppe Jeppesen, 2013; Meyer et al., 2002; Meyer & Allen, 1991; Nazir et al., 2016).

The purpose of this research is to investigate the relationship between e-leadership, teleworking output, sense of purpose, organizational commitment, and employee adaptive performance. Studies that linked those variables to predict employee adaptive performance are limited, especially in remote working during the COVID-19 pandemic. Therefore, a new conceptual framework is proposed. The dependent variable is employee adaptive performance; Perceived e-leadership, teleworking output, sense of purpose, and organizational commitment are independent variables. This study is also keen to determine whether a sense of purpose or organizational commitment can effectively mediate perceived e-leadership and teleworking output into employee adaptive performance. This conceptual framework will

be empirically tested on employees in a medium-to-large organization doing teleworking during the COVID-19 pandemic.

## LITERATURE REVIEW

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Adaptive performance refers to the ability of an individual to adapt to changing working conditions. Employees exhibit adaptive behavior when they modify their behaviors to the needs of working conditions and new occurrences (Pulakos et al., 2000). A study by Pulakos et al. (2000) proposed the first globally recognized concept of adaptive performance, which included the following eight dimensions of adaptive performance: dealing with uncertain or unpredictable work situations; responding creatively to problems; managing work stress; learning new tasks, technologies, and procedures; demonstrating interpersonal adaptability; demonstrating cultural adaptability; and demonstrating physically oriented adaptability. Another research from Charbonnier-Vsoirin and Roussel (2012) tested the eight dimensions of adaptive performance by Pulakos et al. (2000), and constructed another tool to assess individual adaptability across five dimensions: creativity, responsiveness to crises or unexpected events, interpersonal adaptation, training, and managing stress. Creativity refers to a worker's ability to find solutions for, or new approaches to, complex or previously unknown problems. Responsiveness to crises or unexpected events refers to the ability to manage priorities and to adapt to new situations at work. Interpersonal adaptation represents a worker's ability to adjust their interpersonal style to work effectively, whether within their own organization or in partner firms. Training describes the tendency to initiate action to promote personal development. And the last one, managing stress, refers to an individual's ability to maintain his or her composure and to channel his or her team's stress.

E-leadership is defined as virtual communication, knowledge management, and system advancement as a result of ICT, resulting in a "total leadership system" in which leadership and technology are closely tied and affect each other (Liu et al., 2020). New ideas such as "digital leadership" have entered the discussion in recent years and are increasingly associated with e-leadership (Roman et al., 2019). Effective e-leaders are proficient in managing virtual environments, appreciate the current ICT tools, make appropriate selections, and acquire the technical competencies necessary to use the ICT needed (Van Wart et al., 2017). Together with communication, social, team, change management skills, they are required for effective e-leadership. Finally, successful e-leaders integrate important ICT with

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a physical or face-to-face approach, get the right balance out of them, and understand how to utilize them professionally.

Teleworking, telecommuting, or remote working is a broad term that refers to any paid work performed at a distance from the organization's physical location. Employees accomplish organizational goals using ICT and occasionally manage their own time (Tietze & Musson, 2005). Teleworking may provide numerous benefits. It has been established in previous studies that teleworking improves job performance, job happiness, work-life balance, stress levels, and desire to remain with the organization (Coenen & Kok, 2014; Fonner & Roloff, 2010; Kossek et al., 2006; Vega et al., 2015). Additionally, telecommuting lowers commute time, traffic congestion, air pollution (Tremblay & Thomsin, 2012), and job possibilities for women with school children and the disabled (Morgan, 2004). A study from Kazekami (2020) indicates that teleworking boosts staff happiness and job satisfaction. Telecommuters can be more productive because they can work when convenient and are less distracted by coworkers (Golden & Veiga, 2008). It also decreases the human and organizational costs of absenteeism by allowing workers to complete their job commitments even when access to the office is not possible (Nakrošienė et al., 2019). However, teleworking does have some drawbacks that must be considered. A study by Cooper and Kurland (2002) explained that teleworking diminishes the learning gains associated with coworkers. Another danger is social isolation from work teams, resulting in disengagement from their jobs and, eventually, worse performance (Wojcack et al., 2016). Long-term isolation degrades employee performance and increases the likelihood of employee turnover and work-family conflict. Therefore, arguably, it only fits self-organized individuals who are good at time management. In addition, Maruyama and Tietze (2012) found that teleworking might increase employee concerns about the prospect of career possibilities being lost due to lower visibility. One of the biggest concerns among supervisors regarding remote working is the risk of depleted employee performance (Contreras et al., 2020). Finally, teleworking poses ethical problems for e-leaders, such as worker exploitation and information overload, which interfere with workers' personal lives (Cortellazzo et al., 2019; Gálvez et al., 2020).

"Purpose" has become a management focus over the last decade. It has been featured in the titles of hundreds of business and management books and thousands of reports since 2010 (Blount & Leinwand, 2019). The purpose is described as individuals' identification of highly valued, primary goals whose success is expected to get them closer to attaining their ultimate potential and providing them with profound satisfaction (Kosine et al., 2008). A recent study found that a sense of purpose is significantly related to intrinsic

motivation, net the effects of autonomy, self-efficacy, and connection (or the three known antecedents of self-determination theory), and positively associated with working hard and working smart (Good et al., 2021). An earlier study by Ryff and Keyes (1995) explained that there are seven indicators to measure purpose, which are, has goals in life and a sense of directedness; feels there is meaning to present and past life; holds beliefs that give life purpose; has aims and objectives for living; lacks a sense of meaning in life; has few goals or aims; lacks a sense of direction; does not see purpose in past life ; has no outlooks or beliefs that give life meaning. Research from Hill et al. (2016) indicates that individuals with a higher sense of purpose in life tended to have greater engagement in life, higher income, and net worth. In relation to corporate work, companies with a solid sense of purpose are more likely to accept diversity, promote employee innovation, and provide the necessary direction for the staff to achieve their maximum potential (Deloitte, 2014), which strengthen what was suggested earlier by Spence and Rushing (2009) that the secret ingredient of extraordinary companies is the purpose.

In management and organizational behavior literature, commitment to an organization is a well-established notion. While organizational commitment can be defined in various ways, this research adopts Meyer and Allen's model (Meyer et al., 2002), which comprises three dimensions: affective, normative, and continuation. Affective commitment is characterized as an individual emotional relationship, identification, and engagement with the organization and has been linked to a wish to stay with and bring impact to the greater whole (Jønsson & Jeppe Jeppesen, 2013; Nazir et al., 2016; Ohana & Meyer, 2016; Wang et al., 2010). Normative commitment refers to an employee's loyalty and perceived obligation to remain with the organization out of a sense of responsibility, shared values, or reciprocity for the organization's investment in the individual (Jacobs, 2008; Jønsson & Jeppe Jeppesen, 2013; Meyer & Allen, 1991; Nazir et al., 2016). Continuance commitment is motivated by economic transactions and reflects an employee's desire to stay with the company owing to perceived advantages, a lack of appealing alternatives, or a high switching cost (Meyer & Allen, 1991; Thye et al., 2014). It is worth mentioning that organizational commitment is a Western cultural concept. Hence, the extent to which it can be extended to non-Western cultures has been an interesting subject of discussion. Previous research has indicated that organizational commitment might vary among different cultures (Bachkirov, 2018).

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## HYPOTHESIS DEVELOPMENT

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### **E-leadership impact on organizational commitment and sense of purpose**

A study by Boal and Hooijberg (2000) explained that leadership should be focused on the organization's development of meaning and purpose. Gerry Anderson, the former CEO of DTE Energy, exemplifies how leadership may be critical to an employee's sense of purpose. In 2008, he created a film articulating his staff's larger mission. The film embodied the new mission statement of DTE: "We serve with our energy, which is the lifeblood of communities and the engine of growth." The outcome was significant: engagement scores increased. Transformation began. For five consecutive years, the company earned the Gallup Great Workplace Award. Furthermore, from the end of 2008 to 2017, DTE's stock price more than quadrupled (Quinn & Thakor, 2018).

Another study conducted by Iriqat and Khalaf (2017) found that e-leadership is empirically connected to virtual team members' perceptions of organizational commitment. Therefore, the following hypotheses are proposed:

*H1: Perceived e-leadership positively affects sense of purpose.*

*H2: Perceived e-leadership positively affects organizational commitment.*

### **E-leadership and teleworking impact on employee adaptive performance**

Social interaction strengthens traditional leadership. Nevertheless, in virtual environments, this impact is facilitated by ICTs, which change workers' behaviors, feelings, opinions, and performance (Van Wart et al., 2017). E-leaders must be physically and psychologically close to their staff in mitigating the undesirable effects of physical and psychological distance (Stokols et al., 2009). E-leaders must establish trust in their relationships to facilitate the interchange of ideas; they must also facilitate an information stream and produce innovative results (Avolio et al., 2014).

Darics (2017) emphasized that management and leadership functions are integrated with a teleworking situation. Managers are accountable for managing performance, implementing necessary solutions, and maintaining a team identity by developing and sharing the organization's vision, values, and goals in a trusting work environment. Teleworking creates a considerable increase in the volume and velocity of communication; the expansion of communication channels that e-leaders need to be experts on; and the importance for e-leaders to adopt new technological solutions (Van Wart et al., 2016). Therefore, the following hypotheses are proposed:

*H3: Perceived e-leadership positively affects teleworking output.*

*H6: Perceived e-leadership positively affects employee adaptive performance.*

*H7: Teleworking output positively affects employee adaptive performance.*

## **Teleworking impact on sense of purpose and organizational commitment**

For many individuals, the pandemic has halted their progress toward personal life goals and meaningful and rewarding work, affected their sense of purpose, and compelling them to give their days new structures and meaning (Meyer-Kalos et al., 2020). Likewise, teleworking might positively affect the employees' purpose as they spend much less time commuting and hence will have more time with their family and improve the work-life balance. Therefore, it is assumed that an effectual teleworking output will positively impact an employee's sense of purpose.

Researchers and practitioners have taken opposing views on the predicted effects of telework on affective commitment, with some predicting a positive effect and others indicating a detrimental effect. A study by Lim and Teo (2000) suggested that staff with higher organizational commitment will be less favorable to teleworking. In addition, another research from Piper (2004) indicates that teleworking does not increase staff organizational commitment. On the contrary, Golden (2006) found that teleworking is positively related to staff commitment. Wang et al. (2020) also found that continuance commitment is positively associated with psychological and physical isolation.

There is an additional reason to assume that telecommuting could improve employee commitment to the company. These reasons arise mainly from the option to have a work-scheduling arrangement that the employee desires, so this line of thinking would only apply to employees who choose to telecommute voluntarily. Positive job experiences that meet their expectations and basic needs are the primary source of affective commitment. These employees believe that their aims and values align with those of the company. Employees who can work from home are more likely to think that their needs are being met and that the organization's values are aligned with their own. The literature on perceived organizational support adds to the evidence for a beneficial link between teleworking and affective commitment. Previous research suggested that perceived organizational support predicts organizational commitment (Aubé et al., 2007; Makanjee et al., 2006). As such, the following hypotheses are proposed:

*H4: Teleworking output positively affects sense of purpose.*

*H5: Teleworking output positively affects organizational commitment.*

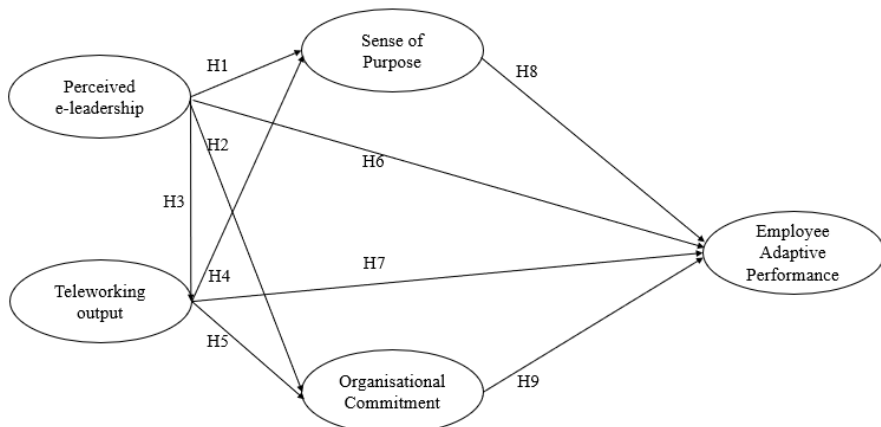
## **Sense of purpose and organizational commitment impact on employee adaptive performance**

Organizational culture demonstrates a distinct sense of purpose and devotion to the organization's objective, which improves employee effectiveness in achieving goals (Narayana, 2017). The greater the individual's experience of purpose and meaning, the stronger their intrinsic work satisfaction, work involvement, and organization-based self-esteem (Milliman et al., 2003). Prior research has also discovered a connection between organizational commitment and employee performance (Cesário & Chambel, 2017). Furthermore, according to a study conducted during the COVID-19 pandemic in a hospitality industry located in the U.S., employees' organizational commitment positively impacted their job performance (Wong et al., 2021). The following hypotheses are proposed based on the objective to find out whether prior research is still relevant for employee adaptive performance in contrast to traditional employee performance:

*H8: Sense of purpose positively affects employee adaptive performance.*

*H9: Organizational commitment positively affects employee adaptive performance.*

Figure 1 below explains the conceptual framework of this research.



**Figure 1.** Conceptual framework



## METHODOLOGY

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This study discovers the relationship between e-leadership, teleworking output, and employee adaptive performance, with a sense of purpose and organizational commitment as mediating roles. It deploys quantitative research with a survey, in which the data is collected cross-sectionally and analyzed with Structural Equation Modelling (SEM). The approach used is PLS-SEM because it is adequate to analyze the explanatory and prediction of the proposed research model (Hair et al., 2019). Moreover, PLS-SEM is suitable for a complex model with several variables where the influences can be evaluated simultaneously (Hair et al., 2019).

### Population and sampling size

Respondents of this study are 271 full-time employees of a privately owned, reputable financial industry company in Indonesia with headquarters in Jakarta, Indonesia. They have been doing work from home (more than 70% of the staff) since April 2020 during the COVID-19 outbreak in Indonesia. It is a census type of data gathering, conducted in August 2021 using a Google form to collect data. As this research uses 271 respondents, the minimum sampling requirement of 160 respondents is therefore met (Kock & Hadaya, 2018).

### Questionnaire and measures

An online survey using Google form was deployed to gather the data from the respondents. It has two parts: the first part of the online survey describes the questions about the respondents' socio-demographic information, and the second part consists of the questions related to the variable used in this study. All variables and indicators used in this study are gathered from previous credible research. The e-leadership variable is taken from Van Wart et al. (2017), where there are four indicators used: e-communication skills (EL1), e-social skills (EL2), e-team building skills (EL3), and e-trustworthiness (EL4). A teleworking output variable is adopted from Nakrošienė et al. (2019), which uses four indicators in the areas of supervisor's trust (TW1), possibility to save travel expenses (TW2), and the possibility to work during the most productive time (TW4). Research from Steger et al. (2012) is used as a reference for the sense of purpose variable, in which there are three indicators to test from greater good motivation (SP1), positive meaning (SP2), and contribution to meaning-making (SP3). The organizational commitment variable is adopted from Meyer and Allen's (1991) definition, which uses the three-component framework of affective (OC1, OC2), continuance, and

normative (OC3) commitment. Furthermore, employee adaptive performance as a target construct uses previous research from Charbonnier-Voirin and Roussel (2012) with four indicators used: solving problem creatively (EP3), training and learning effort (EP5), interpersonal adaptability (EP6), physical adaptability (EP7), and they are measured with the unidimensional approach.

All indicators are measured using a five-point Likert-type scale (from 1 = strongly disagree until 5 = strongly agree), adopted from the English language, and then translated into Bahasa Indonesia. The questionnaire was content-validated by a small test population before the survey was done to ensure the questionnaire was well understood and had no ambiguity.

This study employs the PLS-SEM data analysis method to answer the research question. PLS-SEM can be used for research with an explanatory and predictive approach, complex, and many constructs (Hair et al., 2019). In addition, PLS-SEM does not require normal data distribution. SmartPLS software version 3.3.3 is used to perform the calculation (Memon et al., 2021; Ringle et al., 2015) and is done in two stages. The first stage is the outer model assessment to measure the validity and reliability of the used indicators. The second stage is the structural model assessment to estimate the predictor strength of the proposed research model through R<sup>2</sup>, Q<sup>2</sup>, and RMSE values. Post measuring the research model quality, a hypothesis validity check is done by measuring the significance and coefficient, followed by the mediation analysis.

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## RESULTS

Table 1 provides a socio-demographic profile of the 271 respondents who participated in this survey. Most of them are aged 28-37 (44%), married with children (61%), living with family and children (51%), have a bachelor's degree (78%), with a length of service above five years (46%), working from home (WFH) (88%), and a salary range of USD 701–1400 (38%).

### Measurement model (outer model) assessment

After collecting the respondents' profiles, data processing was done to determine the relationship among constructs. Before deciding the relationship between the constructs, all data had to fulfill the validity and reliability criteria in the measurement model analysis.

**Table 1.** Socio-demographic profile of respondents

Description		Number of respondents	Percentage (%)
Gender	Male	146	54
	Female	125	46
Age	18-27	32	12
	28-37	119	44
	38-47	100	37
	48-57	20	7
Marital Status	Single	71	26
	Married without children	35	13
	Married with children	165	61
Current Living Condition	Living alone	51	19
	Living with friend	3	1
	Living with family	80	29
	Living with family and children	137	51
Highest Education	High School	3	1
	Diploma	24	9
	Bachelor's degree	212	78
	Master's degree	32	12
Length of Employment	0-1 year	20	7
	1-3 year	74	27
	3-5 year	52	19
	> 5 years	125	46
Working Arrangement	1 Day WFH per week	4	1
	2 Day WFH per week	7	3
	3 Day WFH per week	9	3
	4 Day WFH per week	13	5
	Full WFH	238	88
Monthly Salary Range	< USD 700	62	23
	USD 701 - 1400	103	38
	USD 1401 - 2100	43	16
	USD 2101 - 3500	32	12
	> USD 3501	25	9
	Prefer not to answer	6	2

**Table 2.** Construct reliability and validity

Variable	Indicators	Outer loading	Cronbach's Alpha	Composite reliability	AVE
Perceived E-Leadership	EL1: "My leader communicates very clearly through electronic media."	0.837	0.818	0.880	0.649
	EL2: "My leader uses richer media (such as face-to-face meetings, telephone, and virtual conferencing) when appropriate."	0.854			
	EL3: "I participate during the virtual team building conducted by my leader."	0.712			
	EL4: "In leading virtually, my leader has trustworthy integrity."	0.811			
Teleworking Output	TW1: "I think my employer trusts me a lot when providing the opportunity to work from home."	0.854	0.704	0.833	0.625
	TW2: "I work from home to save travel expenses."	0.776			
	TW4: "When working from home, I can work during the most productive time."	0.738			
Sense of Purpose	SP1: "My work gives me the feeling that this is what I was meant to do."	0.826	0.842	0.905	0.761
	SP2: "I know my work makes a positive difference in the world."	0.905			
	SP3: "The work I do serves a greater purpose."	0.884			
Organizational Commitment	OC1: "I am willing to put in a great deal of effort beyond that normally expected in order to help this organization to be successful."	0.876	0.853	0.900	0.694
	OC2: "I really care about the fate of this organization."	0.871			
	OC3: "This organization really inspires the very best in me in the way of job performance."	0.802			
	OC4: "I would accept almost any type of job assignment in order to keep working for this organization."	0.778			

Variable	Indicators	Outer loading	Cronbach's Alpha	Composite reliability	AVE
Employee Adaptive Performance	EP3: "When new or ill-defined work situations arise in your job, I use a variety of sources/types of information to come up with an innovative solution."	0.774	0.796	0.868	0.623
	EP5: "I look for every opportunity that enables me to improve my performance."	0.862			
	EP6: "Developing good relationships with all my counterparts is an important factor of my effectiveness."	0.792			
	EP7: "I strive to adapt, however difficult, to the working conditions I am in during working from home."	0.724			

Table 2 shows that all indicators have outer loadings > 0.708 as required. Construct reliability can be seen on values in the range of 0.70 and 0.95, and thus it can be concluded that the construct reliability test is accepted. AVE measures a convergent validity check, where all values have AVE > 0.50, indicating all constructs explain at least 50 percent of the variance of its items (Hair et al., 2019).

The Heterotrait-Monotrait (HT/MT) Ratio of the correlations is used for the discriminant validity test. Research from Henseler et al. (2015) recommends using a lower and more conservative threshold value of 0.85 when constructs are conceptually more distinct. Table 3 (HT/MT Ratio) shows that all HT/MT values are well under the 0.85 thresholds for all variables. It concludes that all indicators used in this research model are well discriminated against to measure their respective construct. As a conclusion of the outer model assessment, all indicators in this model are reliable (by CA, CR), and valid to measure construct (by AVE), and specific (by HT/MT).

**Table 3.** Discriminant validity

	Employee Adaptive Performance	Organizational Commitment	Perceived E-Leadership	Sense of Purpose
Employee Adaptive Performance				
Organizational Commitment	0.750			
Perceived E-Leadership	0.552	0.546		
Sense of Purpose	0.605	0.715	0.541	
Teleworking Output	0.690	0.493	0.585	0.371

### Structural model (inner model) assessment

Variance Inflation Factor (VIF) is utilized to validate collinearity. The result of the VIF test in this model has shown that all values are below 3, indicating there is no collinearity issue in the data. Goodness-of-fit is not compatible with PLS-SEM as suggested by (Hair et al., 2019). This research uses R<sup>2</sup> as a coefficient of determination to measure predictive accuracy and Q<sup>2</sup> as cross-validated redundancy to measure predictive relevance to test the structural model. Employee adaptive performance has R<sup>2</sup> = 0.498 and Q<sup>2</sup> = 0.296, indicating that this variable is meaningful and has moderate predictive accuracy with medium predictive relevance. PLSpredict is also applied, and Root Mean Square Error (RMSE) values are tested between the Linear Model (LM) value of each indicator compared to the PLS value of each indicator. 3 out of 4 employee adaptive performance indicators have lower RMSE values in PLS. Therefore it concludes that this research model has medium predictive power (Shmueli et al., 2019).

### Hypothesis testing and mediation analysis

Hypothesis testing was performed to determine the impact of the independent variables on the dependent variables and determine whether the hypotheses proposed by this research were supported. A bootstrapping approach is used to assess the significance of the data. A cut-off value of 1.645 (T-statistic  $\geq$  1.645, one-tail, 95% significance level) is used as the criteria to understand if the hypotheses are supported or not.

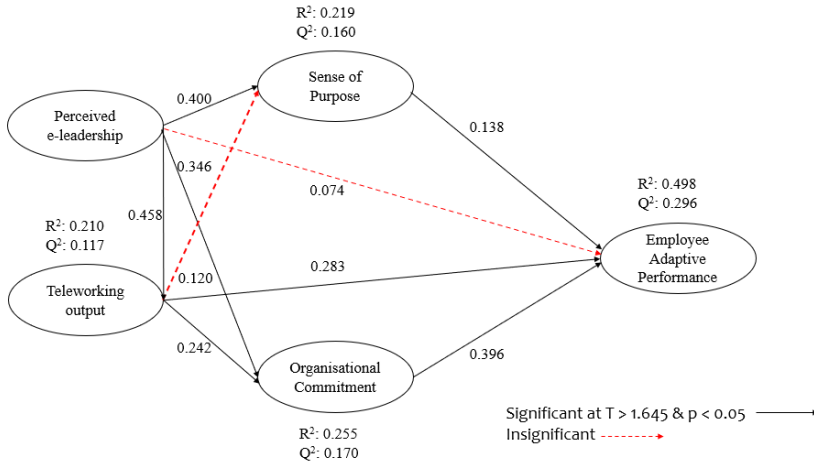
The outcome of the hypothesis testing is shown in Table 4. In addition, mediation analysis is also conducted to determine if the teleworking output, a sense of purpose, and organizational commitment could mediate the impact of perceived e-leadership on employee adaptive performance. In

conducting the mediation assessment in this model, the direct and indirect effects are also assessed.

**Table 4.** Coefficient and significance

Hypothesis	Standard Coefficient	T-statistic	p-value	Results
e-leadership → sense of purpose	0.400	4.980	0.000	H1 Supported
e-leadership → organizational commitment	0.346	4.558	0.000	H2 Supported
e-leadership → teleworking output	0.458	6.115	0.000	H3 Supported
<b>Teleworking output → sense of purpose</b>	<b>0.120</b>	<b>1.479</b>	<b>0.070</b>	<b>H4 Not Supported</b>
Teleworking output → organizational commitment	0.242	2.864	0.002	H5 Supported
<b>Perceived e-leadership → employee adaptive performance</b>	<b>0.074</b>	<b>1.024</b>	<b>0.153</b>	<b>H6 Not Supported</b>
Teleworking output → employee adaptive performance	0.283	4.901	0.000	H7 Supported
Sense of purpose → employee adaptive performance	0.138	1.959	0.025	H8 Supported
Organizational commitment → employee adaptive performance	0.396	6.715	0.000	H9 Supported
<b>Employee Adaptive Performance</b>	<b>R<sup>2</sup></b>	<b>Q<sup>2</sup></b>		
	0.498	0.296		

It is explained in Table 4 and Figure 2 that there are seven hypotheses that are supported with t-statistic  $\geq 1.645$ , p-value  $< 0.05$ , and positive standard coefficients. Teleworking output, organizational commitment, and sense of purpose positively affect employee adaptive performance. Similarly, perceived e-leadership and teleworking output positively affect organizational commitment. Perceived e-leadership also positively affects teleworking output and sense of purpose.



**Figure 2.** Research model result

The other two hypotheses (H4 and H6) are not supported as they have t-statistic  $< 1.645$  and p-value  $\geq 0.05$ ). The relationship between teleworking output and sense of purpose is insignificant. Similarly, the perceived e-leadership relationship to employee adaptive performance is also insignificant.

According to the mediation analysis (see Table 5), all three mediator constructs tested in this study (teleworking output, sense of purpose, and organizational commitment) have a p-value under the threshold of 0.05, indicating that they are all effective mediators of perceived e-leadership towards employee adaptive performance.

**Table 5.** Specific indirect effect/mediation analysis

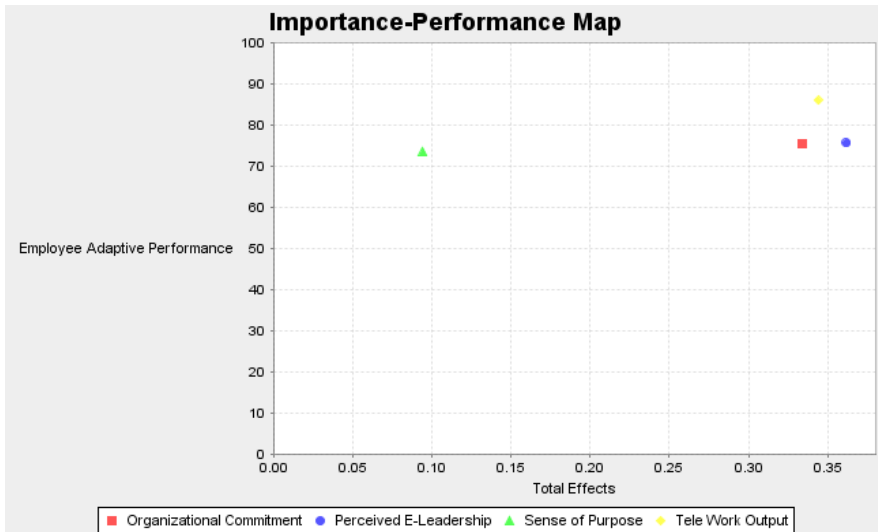
Path	Standard Coefficient	T-statistic	p-value
Perceived E-Leadership → Teleworking Output → Employee Adaptive Performance	0.130	3.577	0.000
Perceived E-Leadership → Teleworking Output → Organizational Commitment	0.111	2.227	0.013
Perceived E-Leadership → Sense of Purpose → Employee Adaptive Performance	0.055	1.779	0.038
Perceived E-Leadership → Organizational Commitment → Employee Adaptive Performance	0.137	3.538	0.000
Teleworking Output → Organizational Commitment → Employee Adaptive Performance	0.096	2.662	0.004



The research also demonstrates that teleworking output is an effective mediator (t-statistic: 2.227) between perceived e-leadership and organizational commitment. Organizational commitment (t-statistic: 2.662) also effectively mediates teleworking output towards employee adaptive performance.

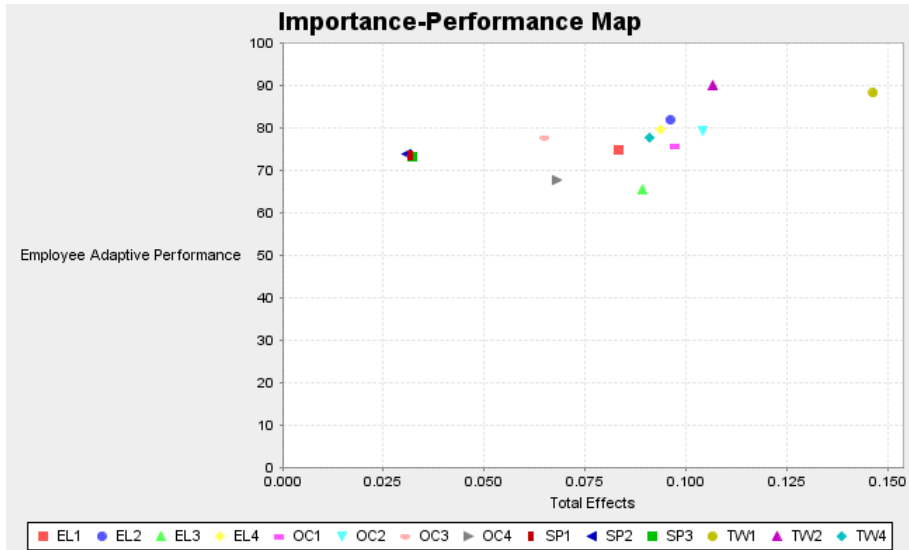
### Importance and performance matrix analysis

The Importance-Performance Map Analysis (IPMA) gives management insights into which areas are more important to a target construct, even when the construct or indicator is underperformed (Ringle & Sarstedt, 2016).



**Figure 3.** Importance-performance map on employee adaptive performance (constructs, unstandardized effect)

The target chosen for the IPMA is the employee adaptive performance variable. Figure 3 explains that perceived e-leadership is the essential construct (with total effect of 0.362) to employee adaptive performance (although it is not the most performing among four constructs) while teleworking output and organizational commitment share similar importance with total effects of 0.344, and 0.334 respectively. It is also understood that sense of purpose is indicated as the least essential construct to employee adaptive performance, with total effect of 0.095. Figure 3 also shows that teleworking output is the highest performance construct, signifying the positive impact on employee adaptive performance.



**Figure 4.** Importance-performance map on employee adaptive performance (indicators, unstandardized effect)

This finding aligns with previous research by Lim & Teo (2000), indicating that teleworking gives married individuals more flexibility in balancing work and family matters. It is also known that 61% of the respondents are married with children.

The IPMA is also used to assess the indicators. Figure 4 shows that the TW1 indicator (“I think my employer trusts me a lot when providing the opportunity to work from home.”) has the highest importance (total effect: 0.146) and the second highest performance (MV performance: 88.284) among all indicators being tested in this study. This result shows that trust from employer to employee is crucial during remote working time and shall be maintained to keep the employee adaptive performance high. EL3 (“I participate during the virtual team building conducted by my leader.”) and OC4 indicators (“I would accept almost any type of job assignment in order to keep working for this organization.”) are the two lowest performance indicators (MV performance: 65.560 and 67.651 respectively). EL3 is associated with team motivation, while OC4 is linked to a strong desire to keep membership (level of staff engagement).

## DISCUSSION

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This study aims to understand how perceived e-leadership and teleworking output influence employee adaptive performance with a sense of purpose and organizational commitment as mediating roles.

The research outcome suggests that perceived e-leadership positively impacts sense of purpose, organizational commitment, and teleworking output. However, the study also found that perceived e-leadership itself does not directly affect employee adaptive performance. This non-supported hypothesis is different from previous research findings. One way to explain this is to know that the last literature on e-leadership was based on voluntary remote working conditions and not during the “crisis mode” of significant uncertainties triggered by the COVID-19 pandemic, impacting management and staff well-being, habits, and expectations. This finding also suggests that e-leadership is not merely about the effectiveness of ICT adoption by senior leadership. Leadership during the non-voluntary remote working condition also requires two-way trust: the employer’s trust to employees and employees to the employer. Management that has trust issues in their employees will continue to be concerned about productivity losses caused by teleworking. Research conducted by Parker et al. (2020) indicates that a lack of trust in employees results in micro-management and excessive control, both of which jeopardize employee performance. The IPMA diagram (Figure 4) signifies that the TW1 indicator (employer’s trust during remote working) has the highest importance among all indicators used in this study to influence employee adaptive performance.

Perceived e-leadership as a total effect, eventually positively affects employee adaptive performance due to the mediating power of teleworking output, organizational commitment, and a sense of purpose. In other words, e-leadership capability alone is insufficient to maintain high employee adaptive performance. It shall be supplemented with either: an excellent teleworking policy, a solid organizational commitment, or a strong sense of purpose.

This study demonstrates the crucial role of teleworking output as both a mediator and independent variable that positively impacts employee adaptive performance. Teleworking output also has a positive influence on organizational commitment. The fact that the TW1 indicator (employer’s trust during remote working) has the highest importance among all indicators gives essential insight to senior management that during the COVID-19 pandemic, most employees prefer a more flexible working model post-pandemic. Research conducted by Alexander et al. (2021) on employees expectations on working flexibility shows that entirely on-site is down from 62 to 37%, hybrid work is up from 30 to 52%, and fully remote is up from 8 to 11% during

the pre-pandemic and post-pandemic time, respectively. This disconnect is more profound than most employers realize, and an increased risk in disengagement and employee attrition rate is climbing. 91% of employees prefer to work from home more often, at least once a week (Robert Walter Groups, 2020), while another research found that most employees around the globe are keen to work no less than three days per week going forward (Alexander et al., 2021). Even more, 83% of Indonesian employees prefer to have more flexible teleworking, which is higher than the global average of 73% (Microsoft, 2021). This aspiration shall be seriously addressed by corporations, particularly the human capital leaders.

This study indicates that teleworking output is not proven to impact a sense of purpose. A logical explanation for this finding is that the workload or work pressure is even higher during working from home. The increased workload occurs due to teleworking during the COVID-19 pandemic, which has negatively impacted many businesses, putting additional pressure on them to deliver more (by doing more work from home). Fauville et al. (2021) discovered that "Zoom Fatigue," which refers to the fatigue experienced during or after video conferencing with any platform, exists. Those employees who attend more frequent and prolonged meetings, report feeling more tired than those who attend fewer and shorter meetings. Furthermore, employees who are fatigued after a virtual meeting are more likely to have a negative attitude toward it. This finding is consistent with previous research by Wrzesniewski (2020), mentioning that people who work alone (or only connect digitally) and away from their usual surroundings may encounter a sense of meaning and purpose degradation. This research also shows that teleworking output has a positive influence on organizational commitment. This insight confirms the hypothesis based on the indirect linkage that perceived organizational support has a beneficial link between telework and affective commitment. Perceived organizational support is a predictor of affective organizational commitment. Likewise, both sense of purpose and organizational commitment positively impact employee adaptive performance, as previously hypothesized. This insight suggests that management must take care of intrinsic motivation to get employees performing in the organization. These constructs will play significant roles and, therefore, should be well-planned, well-executed, and seriously measured to strengthen the employee adaptive performance in an organization.

The IPMA diagram also gives critical insights into the two lowest performance indicators (team motivation and level of staff engagement in the organization). During remote working conditions, management must put extra effort into these areas. By being available, listening to employees,

demonstrating compassionate leadership, showing calmness and optimism, and supporting employees to find meaning or purpose during a crisis, leaders can build employee resilience to boost the staff's motivation. This insight is also consistent with the research from Emmett et al. (2020), suggesting that by aligning the individual purpose and organizational purpose and values, work effectiveness, engagement, and well-being improved by 20.3%, 49%, and 49.3%, respectively. Employees with a high sense of purpose will navigate the high level of uncertainties better, have four times higher engagement and five times higher well-being.

Companies may also need to organize employee engagement or employee-experience management activities, including virtual weekly activities, happy hours, instant appreciation, virtual games, fun challenges, and e-learning. Companies can also consider arranging family engagement training to keep the employees' children well-managed at home while their parents are working from home (Sarkar, 2020). It is also essential for senior leadership to proactively protect employees' health and safety, build employees' social capital, maintain employees' psychological safety at a healthy level, and be transparent during the remote working period of COVID-19. These "employee experience" practices boost employee morale, reinforce team connections, and make employees feel motivated and committed during the pandemic (Chanana & Sangeeta, 2020; Emmett et al., 2020).

## CONCLUSION

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This new norm of work may persist globally even after the pandemic has ended. This shift has disrupted the business model, improved how companies operate and function, and changed how employers and employees interact. Thus, for effective e-leadership, employee performance, and long-term company performance, corporations must adopt and deploy a certain degree of work flexibility. Many employers are keen to resume face-to-face or traditional types of work, while employees, on the other hand, are not. Leaders that refuse to adapt will face the risk of losing talent.

Furthermore, in the future of the workforce, flexible working arrangements will be increasingly tailored considering the company's direction. Staff individual conditions and next-generation enabling technology will help make this process more efficient and effective. Additionally, teleworking will give more options to access remote or foreign talents, which is getting important too, especially during continuous digital transformation and digital talent scarcity in the market.

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The impact of technology advancement and the new working model will not change the fact that companies deal with complex human emotions with self-perceptions and blind spots. Consequently, the future of the companies' success also needs to build intrinsic motivation, such as organizational commitment and purpose. With a solid purpose and commitment to the organization, employees are on the right track to develop unique human competencies that are challenging to automate, such as creativity, partnership, communication, and emotional/spiritual intelligence, which are crucial human capabilities to the business success.

### **Limitations and future directions**

This empirical study has met the research objective and answered the hypotheses. Nevertheless, some research limitations may be relevant for future research. The first limitation is perceived e-leadership as one of the independent variables, in which the detail is collected from the employees' perception. This personal perception might have information bias impacting the accuracy of the data analyzed. Secondly, data collected in this study is taken from a company, of which the results could vary depending on the rate of technology adoption. Therefore, it is suggested to enlarge the research to companies with different technology adoption levels. Thirdly, the current research model has also not included any moderating variables towards employee adaptive performance. Further studies could test the moderating effect of some constructs, such as job stress, work demand, or the employees' psychological capital.

This study has also opened some ideas for future research. The research model result indicates moderate predictive accuracy strength with medium predictive relevance; therefore, the model could be improved by exploring other constructs. 88% of the respondent in this study fully work from home. Further research can be done to analyze deeper if there is any different outcome on hypotheses when the company is doing a specific ratio of hybrid working, e.g., in the proportion of 50:50 of working from home and working from the office. It is worth exploring which virtual team building has the most significant impact on employee adaptive performance. In addition, future research could also observe further how employee adaptive performance influences collective performance.

### **Acknowledgment**

We thank the extremely helpful comments of two anonymous reviewers.

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### Abstrakt

**CEL:** Badanie to ma na celu zbadanie, w jaki sposób postrzegane e-przywódtwo i wyniki telepracy powiązane są z wydajnością adaptacyjną pracowników. Co więcej, stara się zrozumieć, czy poczucie celu i zaangażowanie organizacyjne pełnią rolę mediacyjną. Niniejsze badanie proponuje nowy model badawczy, który jest testowany empirycznie w celu przewidywania wydajności adaptacyjnej pracowników, zwłaszcza podczas pracy zdalnej z powodu pandemii COVID-19. **METODYKA:** Badanie ilościowe zostało przeprowadzone w sierpniu 2021 r. Odpowiedzi uzyskano od 271 telepracowników zatrudnionych w renomowanej prywatnej firmie działającej w branży finansowej w Indonezji. Dane zebrano za pomocą kwestionariusza przy użyciu skali typu Likerta, a następnie przeanalizowano przy użyciu PLS-SEM. **WYNIKI:** Udowodniono, że trzy czynniki poprzedzające mają bezpośredni wpływ na wydajność adaptacyjną pracowników: zaangażowanie organizacyjne, a następnie wyniki telepracy i poczucie celu. Postrzegane e-przywódtwo wpływa pośrednio na wydajność adaptacyjną pracowników i jest zapośredniczone przez wyniki telepracy, zaangażowanie organizacji i poczucie celu. **IMPLIKACJE:** Ten pogląd sugeruje, że kierownictwo musi zadbać o wewnętrzną motywację, aby pracownicy mogli działać w organizacji. Konstrukcje te będą odgrywać znaczącą rolę i dlatego powinny być dobrze zaplanowane, dobrze wykonane i zmierzone, aby wzmocnić wydajność adaptacyjną pracowników w organizacji. Wynik modelu badawczego wskazuje na umiarkowaną siłę trafności predykcyjnej przy średnim znaczeniu predykcyjnym dla wydajności adaptacyjnej pracownika, co daje możliwość ponownego wykorzystania i rozszerzenia modelu badawczego oraz zbadania innych konstruktów. Na podstawie ustaleń kierownictwo musi skoncentrować się na zaufaniu do pracowników, motywacji zespołu i działaniach związanych z zarządzaniem doświadczeniem pracowników, aby utrzymać zaangażowanie pracowników. **ORYGINALNOŚĆ I WARTOŚĆ:** Jest to jedno z pierwszych badań, w których zastosowano wewnętrzną motywację jako poprzednik wydajności adaptacyjnej pracowników, wraz z postrzeganym e-przywódtwem i wynikami telepracy. Korporacje będą mogły skoncentrować się na niektórych kluczowych obszarach, które, jak udowodniono, mają pozytywny wpływ na wydajność adaptacyjną pracowników. **Słowa kluczowe:** e-przywódtwo, telepraca, poczucie celu, zaangażowanie organizacyjne, wydajność adaptacyjna pracowników, COVID-19, motywacja wewnętrzna

## Biographical notes

**Ronny Tan (S.Si.)** is a Senior Vice President of PT Bank Commonwealth. He earned his S.Si degree, 1998, in Physical Science from Institut Teknologi Bandung. He is now a Graduate School of Management student from Universitas Pelita Harapan, Jakarta, Indonesia.

**Ferdi Antonio (Dr. dr. M.M. M.A.R.S)** is an Assistant Professor at the Graduate School of Management, Universitas Pelita Harapan, Jakarta, Indonesia. He earned his Ph.D. degree, 2014, in Management from Trisakti University, Jakarta, Indonesia. He has written several articles in the Hindawi International Journal of Telemedicine and Applications, Webology, Academy of Strategic Management Journal, and Management Science Letters.

## Conflicts of interest

The authors declare no conflict of interest.

## Citation (APA Style)

Tan, R., & Antonio, F. (2022). New insights on employee adaptive performance during the COVID-19 pandemic: Empirical evidence from Indonesia. *Journal of Entrepreneurship, Management, and Innovation*, 18(2), 175-206. <https://doi.org/10.7341/20221826>

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ISBN 978-83-959006-8-6



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