Mobile Payment Research: A Scientometric Assessment of Global Publications Output during 2007-16

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Abstract

The paper examines 1074 global publications on mobile payments research, as covered in Scopus database during 2007–16, experiencing an annual average growth rate of 8.14% and qualitative impact averaged to 3.67 citations per paper. The top 10 most productive countries individually contributed global share from 3.35% to26.26%, with largest global publication share coming from China (26.26%), followed by USA (9.59%), India (6.98%), etc. Together, the 10 most productive countries accounted for 69.14% share of global publication output and 61.73% share of global citation output during 2007–16. Six of the top 10 countries scored relative citation index above the world average i.e. more than 1: USA (2.80), Germany (2.22), South Korea (1.92), U.K. (1.42), Spain (1.40) and Taiwan (1.20) during 2007–16. The international collaborative publications share of top 10 most productive countries varied from 8.51% to 59.46%, in mobile payments research during 2007–16. Computer Science, among the subjects, contributed the largest publication share (72.35%), followed by engineering (28.31%), business, accounting & management (17.41%), social sciences (10.71%), mathematics (8.65%), decision science (6.80%) and economics, econometrics & finance (5.96%) during 2007–16. The top most productive 20 organizations and 15 authors together contributed 18.90% and 10.06% respectively as their share of global publication output and 14.47% and 18.51% respectively as their share of global citation output during 2007–16. Among the total journal output of 362 papers, the top 15 journals contributed 23.20% share to the global journal output during 2007–16. The total mobile payments research, the top 15highly cited publications registered citations from 44 to 207 and they together received 1678 citations, with 111.87 citations per paper. These 15highly cited papers involved the participation of 42 authors and 32 organizations. The largest participation among high cited papers was from USA (6 papers), followed by China (3 papers each), Malaysia, Finland and South Korea (2 papers each), U.K., Switzerland, Australia, Germany, H. Kong, India and Spain (1 paper each). These 15 highly cited papers were published in 8 journals, of which 3 papers each were published in Electronic Commerce Research & Applications and Computers in Human Behavior, 2 papers in Expert Systems & Applications, and 1 paper each in other journals.

KeyTerms: Mobile payment, m–payment, mpayment,Subject area Tag, Country tag, Source title tag

Introduction

Mobile payments may broadly be classified as 'contactless' (also known as 'proximity') or "remote" payments or also known as m-payments, may be defined as any payment where a mobile device is used to initiate, authorize and confirm an exchange of currency in return for goods and services. Mobile devices include mobile phones, PDAs, wireless tablets and other devices that can connect to mobile telecommunication networks[1]. There are basically three mobile payment categories: Mobile Contactless Payment (MCP) - A mobile device initiated payment where the cardholder and the merchant (and/or his/her equipment) are in the same location and communicate directly with each other using contactless radio technologies, such as NFC, for data transfer (also known as contactless payments). Mobile Remote Payment (MRP)-A payment initiated by a mobile device whereby the transaction is conducted over a mobile telecommunication network (e.g., GSM, mobile internet, etc.) and which can be made independently from the

payer's location (and/or his/her equipment). Mobile proximity payment - A mobile payment where the communication between the mobile device and the Point of Interaction device takes place through a proximity technology (e.g., NFC, QR code, etc.)[2,3].

The various existing forms of mobile payment are: (i) SMS Payment; (ii) QR Code Payment; (iii) NFC Payment ; (iv) Payments Within Apps Or Mobile Websites; (v) Virtual Prepaid Cards and (vi) Mobile Credit Card Readers[3]

LITERATURE REVIEW

There are only few quantitative studies available in the past on the scientometric analysis of payment research publications. Among such studies, Dahlberg, et al. looked at the current state of the mobile payment services market from a literature review perspective[4]. We review prior literature on mobile payments, analyze the various factors that impact mobile payment services markets, and suggest directions for future research in this still emerging field. To facilitate the analysis of literature, we propose a framework of four contingency and five competitive force factors, and organize the mobile payment research under the proposed framework. Consumer perspective of mobile payments as well as technical security and trust are best covered by contemporary research. Dennehy & Sammon presented the findings of a review of literature aimed at identifying the key research themes and methodologies researched[5]. In order to uncover these trends the authors reviewed the top twenty cited papers since 1999 and the twenty most recently published papers on m-payments since August 2014. Dahlbergb, Guoa & Ondrusreviewed the mobile payment research literature from around 2006 to 2015 and use a multi-perspective framework to classify and analyze the literature[6]. A new agenda for research is proposed, based on the analysis and results of the authors' critical review that is intended to enhance the quality and relevance of future mobile payment research. The authors also indicate that those researchers have continued to focus on the same topics (especially consumer adoption and technology aspects) with a limited accumulation of new knowledge and similar findings. Besides reviewing the literature, we discuss the possible reasons for the lack of research diversity and propose new recommendations to enhance future mobile payment research.

OBJECTIVES

- To study the growth of world research output in mobile payments research and its citation impact.
- To study the contribution, citation impact and international collaborative papers share of top 10 most productive countries.
- To study the global research output by broad subject areas and the dynamics of its growth and decline and also subject trends by identifying significant keywords.
- To study the publication productivity and citation impact of top 20 and 15 most productive organizations and authors.
- To study the modes of communication in research.
- To study the characteristics of top 15 highly cited papers.

METHODOLOGY

The study retrieved and downloaded 10-year publication data of the world output in mobile payments research from the Scopus database (http://www.scopus.com) covering the period 2007-16.

Keywords, such as "mobile payment" or "m-payment" or "mpayment" were incorporated in the search string and qualified these keywords with "keyword tag" and "Article Title tag", and in addition incorporated in this search string the period '2007-16' within "date range tag". Finally this search string was applied for searching global publication data on mobile cloud computing. The search string was subsequently refined by "subject area tag", "country tag", "source title tag", "journal title name" and "affiliation tag", to get data/information on the distribution of publications output by subject, collaborating countries, author-wise, organization-wise and journal-wise, etc. For citation data, citations to publications were also collected from date of publication till 8 January 2017.

((KEY(Mobile payment or M-payment or Mpayment) AND PUBYEAR > 2006 AND PUBYEAR < 2017) or (TITLE(Mobile payment or M-payment or Mpayment) AND PUBYEAR > 2006 AND PUBYEAR < 2017))

DATA ANALYSIS

❑ Mobile Payment Research

The global mobile payment research resulted in 1074 publications in 10 years during 2007-16. The annual output of the global mobile payment research increased from 65 in the year 2007 to 121 publications in the year 2016, registering 8.14% growth per annum. The cumulative world output in mobile payment research in 5 years i.e. from 2007 to 11 increased from 444 to 630 publications during succeeding 5-year period i.e. 2012-16, registering 41.89% growth. The total global publications output, 62.10% (667) was published as conference papers, 31.38% (337) articles, 2.70% (29) as book chapters, 1.68% (18) as reviews, 0.84% (9) as articles in press and the rest asshort surveys, books, editorials and notes during 2007-16. The impact of global publications on mobile payment research averaged to 3.67 citations per publication (CPP) during 2007-16; five-yearly impact averaged to 6.18 CPP for the period 2007-11 which declined to 1.89 CPP in the succeeding five-year 2012-16 (Table 1).

Table 1: World Output in Mobile Payment Research, 2007-16

Publication Period	World		
	TP	TC	CPP
2007	65	458	7.05
2008	91	765	8.41
2009	91	466	5.12
2010	102	713	6.99
2011	95	343	3.61
2012	110	259	2.35
2013	123	444	3.61
2014	144	301	2.09
2015	132	163	1.23
2016	121	26	0.21
2007-11	444	2745	6.18
2012-16	630	1193	1.89
2007-16	1074	3938	3.67
TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper			

❑ Top 10 Most Productive Countries in Mobile Payment Research

The global mobile payment research had originated from as many as 108 countries in the world during 2007-16. 108 countries, 85 countries contributed 1-9 papers each, 18 countries 11-50 papers each, 3 countries 52-75 papers each and 2 countries 103-208 papers each. Top 10 most productive countries in mobile

payment research had contributed 36-282 publications each during 2007-16 (Table 2). Top 10 most productive countries in mobile payment research together accounted for 71.60% global publication share during 2007-16. Their five-yearly output accounted for 69.14% global publication share and 61.73% global citation share during 2007-11which increased to 73.33% during succeeding 5-year period 2012-16. Each of top 10 countries accounted for 3.35% to 26.26% global publication share during 2007-16, with China accounting for the highest publication share (26.26%), followed by USA (9.59% share), India (6.98% share), U.K. (5.21% share), South Korea (4.84% share), Germany (4.10% share), Taiwan (4% share), France (3.82% share), Spain (3.45% share) and Italy (3.35% share) during 2007-16. The global publication share in five years increased by 4.06% in USA, followed by 3.65% in South Korea, 3.44% in France, 2.64% in Italy,1.92% in India and 0.11% in Spain, as against decrease by 9.38% in China, 1.46% in Germany, 0.47% in Taiwan and 0.33% in U.K. from 2007-11 to 2012-16. Six of the top 10 countries scored relative citation index above the world average i.e. more than 1: USA (2.80), Germany (2.22), South Korea (1.92), U.K. (1.42), Spain (1.40) and Taiwan (1.20) during 2007-16.

Table 2: Global Publication Share of Top 10 Most Productive Countries in Mobile Payment Research

Country	Papers			Share of Papers			TC	CPP	HI	ICP	%ICP	RCI
	2007-11	2012-16	2007-16	2007-11	2012-16	2007-16	2007-16	2007-16	2007-16	2007-16	2007-16	2007-16
China	141	141	282	31.76	22.38	26.26	556	1.97	9	24	8.51	0.54
USA	32	71	103	7.21	11.27	9.59	1060	10.29	13	41	39.81	2.80
India	26	49	75	5.86	7.78	6.98	225	3	7	9	12	0.82
U.K.	24	32	56	5.41	5.08	5.21	292	5.21	8	29	51.79	1.42
South Korea	12	40	52	2.70	6.35	4.84	366	7.04	6	9	17.31	1.92
Germany	22	22	44	4.95	3.49	4.10	359	8.16	8	14	31.82	2.22
Taiwan	19	24	43	4.28	3.81	4	190	4.42	7	7	16.28	1.20
France	8	33	41	1.80	5.24	3.82	127	3.10	7	18	43.90	0.84
Spain	15	22	37	3.38	3.49	3.45	190	5.14	6	22	59.46	1.40
Italy	8	28	36	1.80	4.44	3.35	126	3.50	7	11	30.56	0.95
Total	307	462	769	69.14	73.33	71.60	3491	4.54	7.8	184	23.93	1.24
World	444	630	1074				3938	3.67				
Share of 10 Countries in World Total	69.14	73.33	71.60				88.65					
TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper; HI=h -index; ICP=International Collaborative Papers; RCI=Relative Citation Index												

❑ International Collaboration

The international collaborative share of top 10 countries in their respective national output varied from 8.51% to 59.46%, with highest share coming from Spain (59.46%), followed by U.K. (51.79%), France (43.90%), USA (39.81%), Germany (31.82%), Italy (30.56%), South Korea (17.31%), Taiwan (16.28%), India (12.0%) and China (8.51%) during 2007-16.

❑ Subject-Wise Distribution of Research Output

The global mobile payment research output published during 2007-16 is distributed across seven sub-fields (as identified in Scopus database classification) with computer science accounting for the highest publications share (72.35%), followed by engineering (28.31%), business, accounting & management (17.41%), social sciences (10.71%), mathematics (8.65%), decision science (6.80%) and economics, econometrics & finance (5.96%) during 2007-16. The activity index, which computes change in research activity in a discipline over time 2007-11 to 2012-16 (world average activity index of a given subject is taken as 100), witnessed increase in engineering by 14.48 (from 91.51 to 105.99), social sciences by 9.11 (from 94.65 to 103.77), mathematics by 27.33 (from 84.03 to 111.26) and economics, econometrics & finance by 48.05 (from 71.81 to 119.87), as against decline of research activity in computer science by 16.34 (from 109.58 to 93.25), business, accounting & management by 19.17 (from 111.24 to 92.08) and decision science by 61.13 (from 135.86 to 74.73) from 2007-11 to 2012-16. In terms of citation impact per paper, decision science registered the highest impact of 12.44, followed by business, accounting & management (7.37), computer science (4.34), social sciences (3.63), engineering (2.38), mathematics (1.71) and economics, econometrics & finance (1.52) (Table 3).

Table 3: Subject-Wise Breakup of Global Publications in Mobile Payment Research

Subject	Papers (TP)			Activity Index			TC	CPP	%TP
	2007-11	2012-16	2007-16	2007-11	2012-16	2007-16	2007-16	2007-16	2007-16
Computer Science	352	425	777	109.58	93.25		3374	4.34	72.35
Engineering	115	189	304	91.51	105.99		725	2.38	28.31
Business, accounting & management	86	101	187	111.24	92.08		1378	7.37	17.41
Social Sciences	45	70	115	94.65	103.77		417	3.63	10.71
Mathematics	33	62	95	84.03	111.26		162	1.71	8.85
Decision Science	41	32	73	135.86	74.73		908	12.44	6.80
Economics, econometrics & finance	19	45	64	71.81	119.87		97	1.52	5.96
World Output	444	630	1074						
TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper									

❑ Top 20 Most Productive Global Organizations

In global mobile payment research, the productivity of 20 most productive global organizations varied from 7 to 34 publications and together they contributed 18.90% (203 publications) publication share and 14.47% (570) citation share to its cumulative publications output during 2007-16. The scientometric profile of these 20 organizations is presented in Table 4. Four of these organizations registered publications output greater than the group average of 10.15: Beijing University of Post & Telecommunications, China (34 papers), Universidad de Granada, Spain (14 papers), Huazhong University of Science & Technology, China (13 papers) and Copenhagen Business School, Denmark (11 papers) during 2007-16. Fiveorganizations registered impact above the group average of 2.81citations per publication) during 2007-16: Huazhong University of Science & Technology, China (13.46), ESSEC Business School, France

(6.25), Universidad de Granada, Spain (4.36), Universidad de Carabobo, Venezuela and Universidad Carlos III de Madrid, Spain (3 each) during 2007-16. Six organizations registered h-index above the group average of 2.02: ESSEC Business School, France and Beijing University of Post & Telecommunications, China (4 each), Universidad de Granada, Spain, Kainan University, Taiwan, Zhejiang Wanli University, China and Bishop Herbert College, India (3 each) during 2006-17. Seven organizations contributed international collaborative publications share above the group average of 18.23%: Universidad de Carabobo, Venezuela (100%), Universidad Carlos III de Madrid, Spain (87.50%), ESSEC Business School, France (62.50%), University College Cork, Ireland (50%), Copenhagen Business School, Denmark (27.27%), French Telecom, Orange Labs, France (25%) and Universidad de Granada, Spain (21.43%) during 2007-16. Five organizations registered the relative citation index above the group average

(0.77) of all organizations: Huazhong University of Science & Technology, China (3.67), ESSEC Business School, France (1.70), Universidad de Granada, Spain (1.19), Universidad de Carabobo, Venezuela and Universidad Carlos III de Madrid, Spain (0.82 each) during 2007-16.

❑ **Top 15 Most Productive Authors**

In the field of global mobile payment research, the research productivity of top 15 most productive authors varied from 6 to 10 publications. Together they contributed 10.06% (108 publications) global publication share and 18.51% (729) citation share during 2007-16. The scientometric profile of these 15 authors is presented in Table 5. Five authors registered publications output above the group average of 7.2: F.Liebana - Cabanillas and J.Ondrus (10 papers each), S.S.Ahamad and K.Pousttchi (9 authors each) and P.Urien (8 papers each) during 2007-16. Three authors registered impact above the group average of 6.75 citations per publication: J. Ondrus (26.1), R. J. Kauffman (22) and F. Munoz-Leiva (9.67) during 2007-16. Six authors registered h-index above the group average of 2.47 of all authors: J. Ondrus (5), R. J. Kauffman, F. Munoz-Leiva and F.Liebana - Cabanillas, M. Pasquet and R. Martinez - Pelaez (3 each) during 2007-16. Five authors contributed international collaborative publications share above the group average of 27.78% of all authors: R. Martinez - Pelaez and J. T. Isaac (100% each), J. Ondrus (80%), R. J. Kauffman (50%) and J. Hedman (33.33%) during 2007-16. Three authors registered the relative citation index above the group average (1.84) of all authors: J. Ondrus (7.11), R. J. Kauffman (5.99) and F. Munoz - Leiva (2.63) during 2007-16.

Table 4: Scientometric Profile of Top 20 Most Productive Global Organizations in Mobile Payment Research

Organization	TP	TC	CPP	HI	ICP	%ICP	RCI
Beijing University of Post & Telecommunications, China	34	56	1.65	4	1	2.94	0.45
Universidad de Granada, Spain	14	61	4.36	3	3	21.43	1.19
Huazhong University of Science & Technology, China	13	175	13.46	2	1	7.69	3.67
Copenhagen Business School, Denmark	11	12	1.09	2	3	27.27	0.30
Kainan University, Taiwan	10	25	2.50	3	0	0	0.68
Zhejiang University, China	9	9	1	1	0	0	0.27
Zhejiang Wanli University, China	9	22	2.44	3	0	0	0.67
South China University of Technology, China	9	6	0.67	2	1	11.11	0.18
Universidad de Carabobo, Venezuela	9	27	3	2	9	100	0.82
Universidad Carlos III de Madrid, Spain	8	24	3	2	7	87.50	0.82
ESSEC Business School, France	8	50	6.25	4	5	62.50	1.70
Universitat Augsburg, Germany	8	22	2.75	2	0	0	0.75
Chonquing University of Posts & Telecommunications, China	8	2	0.25	1	0	0	0.07
University College Cork, Ireland	8	11	1.38	2	4	50	0.37
TELECOM, Paris Tech, France	8	4	0.50	1	1	12.50	0.14
Islamic Azad University, Iran	8	10	1.25	2	0	0	0.34
French Telecom, Orange Labs, France	8	16	2	2	2	25	0.54
Dalian University of Technology, China	7	6	0.86	1	0	0	0.23
Bishop Herbert College, India	7	17	2.43	3	0	0	0.66
Institute for Development & Research in Banking Technology, India	7	15	2.14	2	0	0	0.58
Total of 20 organizations	203	570	2.81	44	37	18.23	0.77
Total of World	1074	3938	3.67				
Share of top 20 organizations in World total output	18.90	14.47					

TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper; HI=h-index; ICP=International Collaborative Papers; RCI=Relative Citation Index

Table 5: Scientometric Profile of Top 15 Most Productive Authors in Mobile Payment Research

Author	Affiliation of the Author	TP	TC	CPP	HI	ICP	%ICP	RCI
F.Liebana - Cabanillas	University of Granada, Spain	10	60	6	3	1	10	1.63
J.Ondrus	ESSEC Business School, France	10	261	26.1	5	8	80	7.11
S.S.Ahamad	Institute for Development & Research in Banking Technology, India	9	16	1.78	2	1	11.11	0.48
K.Pousttchi	Business School, Germany	9	49	5.44	2	1	11.11	1.48
P.Urien	Telecom Paris Tech, France	8	11	1.38	2	1	12.50	0.37
R.Martinez-Pelaez	Technical University of Catalonia, Spain	7	18	2.57	3	7	100	0.70
S.K. Udgata	University of Hyderabad, India	7	14	2	2	0	0	0.54
J.Hedman	Copenhagen Business School, Denmark	6	6	1	1	2	33.33	0.27
J.T.Isaac	Universidad de Carabobo, Venezuela	6	24	4	2	6	100	1.09
R.J.Kauffman	Singapore Management University	6	132	22	3	3	50	5.99
F.Munoz-Leiva	University of Granada, Spain	6	58	9.67	3	0	0	2.63
C.M.Ou	Kainan University, Taiwan	6	19	3.17	2	0	0	0.86
C.R.Ou	Hsiuping Institute of Technology, Taiwan	6	19	3.17	2	0	0	0.86
M.Pasquet	UNICAEN,GREYC, France	6	30	5	3	0	0	1.36
S.A.Rabara	St. Joseph College, Tiruchirappalli, India	6	12	2	2	0	0	0.54
Total of 15 authors		108	729	6.75	2.47	30	27.78	1.84
Total of World		1074	3938	3.67				
Share of top 15 authors in World total output		10.06	18.51					

TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper; HI=h-index; ICP=International Collaborative Papers; RCI=Relative Citation Index

❑ **Medium of Communication**

The total world output in mobile payment research, 51.02% (548) appeared as conference papers, 33.71% (362) in journals, 11.08% (119) in book series, 3.07% (33) in book and 1.12% (12) in trade publications. The top 15 most productive journals accounted for 4 to 16 papers each in mobile payment research and together accounted for 23.20% share (84 papers) of total publication output during 2007-16. The publication share of these top 15 most productive journals increased from 18.02% to 25.50% between 2007-11 and 2012-16. The top most productive journal (with 16 papers) was Electronic Commerce Research and Applications, followed by International Journal of Mobile Communications (7 papers), Computers in Human Behavior and Wireless Personal Communications (6 papers each), etc. during 2007-16 (Table 6).

Table 6: Top 15 Most Productive Journals in Mobile Payment Research

Journals	Papers		
	2007-11	2012-16	2007-16
Electronic Commerce Research and Applications	9	7	16
International Journal of Mobile Communications	2	5	7
Computers in Human Behavior	2	4	6
Wireless Personal Communications	1	5	6
Economist, U.K.	0	5	5
International Journal of Applied Engineering Research	0	5	5
Journal of Internet Banking & Commerce Research	2	3	5
IEEE Transaction on Mobile Computing	1	4	5
Journal of Theoretical & Applied Electronics Commerce Research	0	5	5
IT Professional	0	4	4
Industrial Management & Data Systems	0	4	4
Information Systems Frontier	0	4	4
Journal of Convergence Information Technology	0	4	4
Telecommunication Policy	0	4	4
Tongxin Xuebao Journal on Communication	3	1	4
Total of 150 journals	20	64	84
Total global journal output	111	251	362
Share of top 15 journals in global journal output	18.02	25.50	23.20

❑ **Significant Keywords**

Around 42 significant keywords have been identified from the

Table 7: List of Significant Keywords in Literature on Mobile Payment Research

Keyword	Frequency	Keyword	Frequency
Mobile Payment	556	Communication Systems	46
Global System for Mobile Communications	379	Electronic Payment	46
Electronic Commerce	211	Internet	46
Mobile Devices	197	Network Protocols	45
Mobile Tele-communication Systems	176	Information Technology	43
Mobile Commerce	149	Security of Data	41
Electronic Money	124	Micro Payments	35
Mobile Payment System	138	Smart Cards	34
Near Field Communications	118	Data Privacy	33
Wireless Networks	100	Mobile Payment Protocols	33
Commerce	95	E-Payments	32
Athentification	93	Transactions	32
Security	81	RFID	29
Payment System	80	Credit Cards	27
Network Security	65	E-Commerce	26
Wireless Tele-communication System	61	Internet Protocols	26
Mobile Security	59	Mobile Banking	26
Mobile Computing	58	Mobile E-Commerce	21
Sale	51	Online Payments	21
Cryptography	49	Mobile Money	19
Smart Phones	49		
Information Systems	47		

literature on mobile payment research, which point to possible trends in mobile cloud computing research. These keywords are listed in Table 7 in the decreasing order of the frequency of occurrence during 2007-16.

❑ **Highly Cited Papers**

A total of 15 highly cited papers were identified which received citations from 44 to 207 during 2007-16. These 15 papers together received 1678 citations, which averaged to 111.87 citations per paper. Out of the 15 highly cited papers, 5 resulted from the participation of single organization (non-collaborative) and 10 involved the participation of two or more organizations (5 national collaborative and 5 international collaborative). Among international collaborative papers, the largest participation was from USA (6 papers), followed by China (3 papers each), Malaysia, Finland and South Korea (2 papers each), U.K., Switzerland, Australia, Germany, H. Kong, India and Spain (1 paper each). The 15 highly cited papers involved the participation of 42 authors and 32 organizations. Out of the 15 highly cited papers, 13 were published as articles, 1 as review paper and 1 as conference paper. These 15 highly cited papers were published in 8 journals, of which 3 papers each were published in Electronic Commerce Research & Applications and Computers in Human Behaviour, 2 papers in Expert Systems & Applications and 1 paper each in Journal of Strategic Information Systems, International Journal of Mobile Communications, Information and Management, Computer Standards & Interfaces and Decision Support Systems

CONCLUSION & SUMMARY

As a result of global mobile payment research, 1074 publications were published as indexed in Scopus database during last 10 years during 2007-16: their annual publication output increased from 65 to 121 from the year 2007 to the year 2016, registering 8.14% growth per annum and cumulative publication output increased from 444 to 630 publications from 2007-11 to 2012-16, registering 41.89% growth. The citation impact per paper registered by global publications on mobile payments research was 3.67, which decreased from 6.18 to 1.89 from 2007-11 to 2012-16. The top 10 most productive countries in mobile payments research individually contributed global share from 3.35% to 26.26 % and together accounted for 69.14% share of global publication output and 61.73% share of global citation output during 2007-16. Among the top 10 countries, the largest global publication share (26.26%) was contributed by China, followed by USA (9.59% share), India (6.98% share), U.K. (5.21% share), South Korea (4.84% share), Germany (4.10% share), Taiwan (4% share), France (3.82% share), Spain (3.45% share) and Italy (3.35% share) during 2007-16. The global publication share increased in USA, South Korea, France, Italy, India and Spain, as against decrease China, Germany, Taiwan and U.K. from 2007-11 to 2012-16. Six of the top 10 countries scored relative citation index above the world average i.e. more than 1: USA (2.80), Germany (2.22), South Korea (1.92), U.K. (1.42), Spain (1.40) and Taiwan (1.20) during 2007-16. The international collaborative share of top 10 countries in their respective national output varied from 8.51% (China) to 59.46% (Spain) during 2007-16. Computer Science, among subjects, contributed the largest publication share (72.35%), followed by engineering (28.31%), business, accounting & management (17.41%), social sciences (10.71%), mathematics (8.65%), decision science (6.80%) and

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economics, econometrics & finance (5.96%) during 2007-16. The activity index, witnessed increase in engineering, social sciences, mathematics and economics, econometrics & finance, as against decline of research activity in computer science, business, accounting & management and decision science from 2007-11 to 2012-16. In terms of citation impact per paper, decision science registered the highest impact of 12.44, followed by business, accounting & management (7.37), computer science (4.34), social sciences (3.63), engineering (2.38), mathematics (1.71) and economics, econometrics & finance (1.52) during 2007-16. The top most productive 20 organizations and 15 authors together contributed 18.90% and 10.06% respectively as their share of global publication output and 14.47% and 18.51% respectively as their share of global citation output during 2007-16. Among the total journal output of 362 papers, the top 15 journals individually contributed 4-16 papers and together contributed 23.20% share to the global journal output during 2007-16. The total mobile payments research, the top 15 highly cited publications registered citations from 44 to 207 and they together received 1678 citations, with 111.87 citations per paper. These 15 highly cited papers involved the participation of 42 authors and 32 organizations. The largest participation among high cited papers was from USA (6 papers), followed by China (3 papers each), Malaysia, Finland and South Korea (2 papers each), U.K., Switzerland, Australia, Germany, H. Kong, India and Spain (1 paper each).These 15 highly cited papers were published in 8 journals, of which 3 papers each were published in Electronic Commerce Research & Applications and Computers in Human Behaviour, 2 papers in Expert Systems & Applications, and 1 paper each in other journals.

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