

Canadian University Contributions to International Business Research

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Abstract

Reflecting challenges that globalization presents for business education, the AACSB [1] calls for fundamental reconsideration of the role of international business (IB), including IB teaching and research. Although Canadian universities produced a significant proportion of IB research in the discipline's early years, the proportion of IB research generated by Canadian universities has declined. This study assesses institutional productivity in IB research over a 45-year period, 1970-2014, with emphasis on the nature and extent of performance of Canadian universities. Main trends in institutional productivity within published IB research are identified, both worldwide and specifically for Canadian institutions, including overall research productivity of Canadian institutions versus institutions from the USA, Europe, and Asia-Pacific. Co-authorship trends, by time and region, are examined. Ranking of the most productive institutions, worldwide and among Canadian universities, are presented for 1970-2014 and nine 5-year sub-periods, identifying key changes over these nine periods. Implications for university administrators and other key stakeholders are addressed along with potential limitations and suggested future research.

Keywords: international business; institutional productivity; Canada; university; research; publication; national competitiveness

Introduction

Economic globalization represents one of the most prominent trends of the past 50 years. For example, exports of goods and services as a proportion of global gross domestic product expanded from 12 percent in 1960 to over 30 percent in 2018, while similar figures for Canada involved an expansion from 17 percent in 1960 to over 32 percent in 2018 [2]. Global outward foreign direct investment has expanded at an even greater rate, increasing from \$14 billion in 1970 to \$1.7 trillion in 2015 [3, 4].

To promote international competitiveness and economic prosperity in the face of this transformative globalization process, nations across the globe are competing to develop and exploit leading-edge knowledge and corresponding innovative outcomes. Research universities are an important element of such efforts, as they occupy a recognized place in the creation, refinement, and transfer of knowledge [5, 6]. As indicated in the Speech from the Throne for the second opening of the 41st Parliament, Canada's university system has a critical role in sustaining the country's prosperity during this time of change [7]. Indeed, success in fostering a vibrant university system can enhance Canada's ability to attract and retain leading scholars,

students, and research programmes, and thereby contribute to the nation's development of internationally competitive knowledge and innovation clusters [5, 8].

Implications of the globalization process are particularly salient for business schools, as globalization fundamentally impacts decisions regarding strategy, organization, and operations within and across nations and regions of the world. Indeed, the AACSB [1] reports that globalization may be the most fundamental challenge impacting business education, calling for fundamental reconsideration of the role of international business (IB) in business schools. Recognition of the importance of IB has been widespread among academic institutions, which have undertaken continued efforts to internationalize teaching and research. Effectiveness of such efforts can be expected to vary, however, leading to efforts to analyze the relative effectiveness of institutions in promoting development of IB research and associated competencies.

In emphasizing the seminal role of research in testing, codifying, organizing, and diffusing innovation, the AACSB states, "high quality management research can legitimize new ideas and facilitate adoption in organizations" and such research "can help people to decide what not to do and how not to do it" [1, p. 25]. To the extent that scholars in IB can undertake and disseminate timely and insightful research capable of shedding light on improved approaches for forming, expanding, and managing businesses in a globalizing competitive environment, the practice of management – and potential benefits deriving from globalization – may be enhanced. The AACSB pointedly emphasizes this, stating, "Business schools are part of a larger system and have a responsibility to take a leadership role in the globalization of business and society – to move from change taker to change maker" [1, p. 216].

One means of assessing contributions to the development of the field of IB, and changes in relative ranking of various institutions in promoting IB research, is through evaluation of the research productivity of authors affiliated with these institutions. Publications play an important role in advancing the body of academic knowledge and in facilitating advancement in management practice, and they represent an important consideration in evaluation of scholars and institutions with respect to hiring, promotion, tenure, compensation, accreditation of schools, and reputation and ranking of institutions, *inter alia* [9, 10, 11, 12, 13, 14]. Examination of institutional productivity may assist current or future scholars in their decisions regarding where to pursue graduate education or subsequent employment, both specifically in IB and in affiliated disciplines. Such analysis may also yield valuable insights into key institutional sources of contributions to development of the field of IB, identify important trends, and provide information that may prove useful to university administrators and other public or private sector individuals or institutions in evaluating prior and future allocation of resources.

Despite the potential value of such an approach, particularly at this pivotal stage of IB's evolution as a field of serious academic inquiry, evaluation of publication-based productivity of academic institutions in IB has received limited attention, especially in terms of assessing such productivity over an extended time. There is a particular absence of systematic efforts to assess IB research productivity for Canadian universities. This study's purpose is to offer such an evaluation, assessing institutional productivity over the 45-year period from 1970 to 2014, with emphasis on trends involving the nature and extent of performance of Canadian universities.

This study is organized in three sections. The first section presents the methodological approach used for assessing institutional productivity of IB research, including how the population of qualifying research was determined and the approach used for analysis. In the second section, results of the analyses are presented, including the main trends in institutional

productivity in published IB research, both worldwide and specifically for Canadian institutions. The review identifies major trends regarding overall research productivity of Canadian institutions, versus institutions from the USA, Europe, and Asia-Pacific. Trends in the extent of co-authorship in published IB research by time and region are examined. Rankings of the most productive institutions are presented and discussed, both worldwide and specifically among Canadian universities, for the 45-year period ranging from 1970 to 2014 and for corresponding 5-year periods, and key changes are identified over these periods. Finally, in the third section, the paper concludes with a discussion of key conclusions, implications, and directions for future research.

Research Methodology

Journal Selection

Evaluation of journal-based productivity of academic institutions requires identification of an appropriate sample of publications, that is, journals of sufficient quality such that articles published therein can be considered to generally contain a substantial proportion of the journal-based contributions to a field's literature. Identification of appropriate journals has been acknowledged to be a difficult, even controversial task [15, 16].

Several surveys have consistently rated the *Journal of International Business Studies (JIBS)* as the leading journal devoted to the field of IB [e.g., 13, 17, 18, 19, 20] and expert ratings of journals have been substantiated by objective measures of scholarly influence. Although a relatively young publication, data in the Social Sciences Citation Index also reveal that *JIBS'* ratings on two key ratios, current article impact and cumulative journal impact, have continued to increase in recent years and place *JIBS* among the leading journals in business and management [18, 19].

As the leading IB-focused scholarly journal, *JIBS* is used as a point of departure to identify journals to include in the analyses. Because of IB's relatively young stage of development, its cross-functional nature, and the tendency of many journals to appeal to audiences of limited size and scope, it was unlikely that all or even a majority of the most significant recent journal publications in IB have appeared in a single journal. Although only one measure of contribution, citations have been argued to be a valuable objective measure for assessing contributions [21, 22, 23]. Therefore, each of the journal citations contained in the articles and research notes that were published in issues of *JIBS* from 1980 through 1991 were counted, and the 14 most highly cited journals were identified. The decision to include only the 14 highest-cited journals was based on observed traits of the sample, namely that the 14th ranked journal had over 29% more citations than the next highest ranked journal, representing a natural breakpoint for inclusion.

This analysis also allowed this study to respond to calls to include general management journals in assessment of IB research productivity [e.g., 24]. In addition to 3 IB-focused journals, namely *JIBS*, *Journal of World Business* (previously *Columbia Journal of World Business*), and *Management International Review*, eleven journals encompassing different business disciplines were identified: *Academy of Management Journal*, *Academy of Management Review*, *Administrative Science Quarterly*, *American Economic Review*, *California Management Review*, *Harvard Business Review*, *Journal of Finance*, *Journal of Marketing*, *Journal of Marketing Research*, *Sloan Management Review*, and *Strategic Management Journal*.

Article Selection

Due to the wide variety of topics contained in the sample journals, only those publications focused explicitly on IB issues were included. These publications were identified using the definition of IB developed by Nehrt *et al.* [25], subsequently reiterated by Ricks [26] as editorial policy at *JIBS*, and used by Morrison and Inkpen [27] in their study of significant IB contributions. This definition is included as Appendix 1 of this paper.

Using this definition, all articles and research notes published in the 14 sample journals between the beginning of 1970 and the end of 2014 were identified. Other journal contents, including case studies, monthly columns, introductions to special issues, letters to the editor, editorials, book reviews, comments and replies, and dissertation abstracts, *inter alia*, were excluded from analysis. This process resulted in identification of the 5,408 qualifying publications that represent the population of IB articles for these journals for these years.

These publications were manually coded, including categorization for each of the following: author, author's institution of affiliation, geographic location of the affiliated institution, journal, journal's volume and issue, type of article, and number of authors. This classification process was replicated for all 14 journals under study and resulted in a population database comprising 5,713 authors and 1,564 affiliated institutions, both academic and non-academic, that were listed for at least one qualifying article in the sample journals during the 45-year period of study.

Analyses

This study takes a similar approach to measuring institutional productivity as Lahiri and Kumar [11] and Chan *et al.* [12], who assessed both absolute and adjusted productivity. Absolute productivity consists of assessing the absolute number of appearances for a given author, regardless of the author's share in the publication. As such, a publication with a sole author will be counted as one appearance, whereas a publication with five authors will be counted as five appearances.

Reporting of absolute frequencies of appearances by individual authors can result in bias attributable to multiple authorship for many of the sample articles. Therefore, in addition to absolute frequencies of authors' appearances, appearances adjusted for number of authors were also calculated. Although some prior studies have given greater credit to the lead author [e.g., 28], this study adopted the approach used in other studies [27, 29, 30] and assigned credit proportionally, weighted equally based on number of authors for a particular publication. For example, the listed institution of an individual who was sole author was credited with 1.0 point, the institution of each author in a dual-authored paper received 0.5 points, the institution of each author in a four-author paper received 0.25 points, and so forth. Results are presented below for the 45-year period ranging from 1970 and 2014, as well as for the corresponding 5-year period included in this study.

Trends in Institutional Productivity in IB Research: Canada and the World

Research Productivity of Canadian Institutions versus Institutions from Other Regions

The dataset included authors affiliated with 51 Canadian institutions, comprised of 40 academic institutions and 11 non-academic institutions (e.g., Bank of Canada, Canadian Department of Energy). Absolute productivity in terms of number of appearances of authors from the 40 Canadian academic institutions ranged from 1 to 150 total appearances during 1970-

2014 (Table 1a). When adjusted for multiple authors, productivity ranged from 0.33 to 73.72 appearances per institution (Table 1b).

The following analyses only compare Canadian institutions to the most productive regions, namely Asia-Pacific, Europe, and the USA. The Middle East, Latin America, and Africa demonstrated minimal overall productivity in IB research during the period of study (Table 2).

Authors affiliated with institutions from the USA have consistently accounted for the highest proportion of IB research from 1970 to 2012, on both an absolute and adjusted basis, as shown in Figures 1a and 1b. However, starting in 2013, authors affiliated with institutions from Europe have accounted for the highest proportion of IB research in each of the years and with authors from the Asia-Pacific region closely behind.

Until the mid-1990s, the overall level of productivity associated with authors from Canadian institutions was broadly comparable with the level of productivity of authors from the entire Asia-Pacific region in terms of both absolute and adjusted productivity, not starting to have more than 10 annual appearances until 1980 (Figures 1a and 1b). Productivity of Canadian authors demonstrated an increase in the early 1980s and, by the mid-1980s, productivity of Canadian authors exceeded that of all authors from European or Asia-Pacific institutions. However, productivity of European authors rose and surpassed that of Canada after 1986, a position they never relinquished, with European authors never appearing less than 17 times on an absolute basis in any year after 1986.

The first year that authors from Asia-Pacific institutions exhibited significantly higher productivity than their peers from Canadian institutions was 1986. Starting in the early 1990s, publications by Asia-Pacific authors began increasing and diverged permanently from the level of their Canadian counterparts after 1994. In 1995, Asia-Pacific authors had 21 absolute appearances and Canadian authors had 7 appearances (Figure 1a). Relative productivity based on adjusted appearances followed a similar trend (Figure 1b).

In contrast, 1987 marked a low point in terms of Canadian productivity in IB research productivity, witnessing the lowest number of appearances (5) by Canada-affiliated authors from 1976 to 2014. Canadian authors plateaued at a level of 18 or fewer publications per year from 1988 to 2006 before showing increased productivity from 2007 onwards, yet they never again equalled the level of their counterparts from the USA, Europe, or Asia. It is worth mentioning that after reaching a high of 41 appearances in 2010, Canadian researchers have not exceeded the threshold of 29 publications in any year after 2010.

Overall, while the absolute number of IB research publications have increased over the course of the 45 years covered in this study, the relative benefits have not been equally shared among the different regions. Starting in the early 1980s, authors affiliated with both European and Asia-Pacific institutions demonstrated increased absolute productivity in publishing IB research. Table 3a shows the absolute number of publications and the associated percentage of publications produced by authors affiliated with USA, Asia-Pacific, European, and Canadian institutions, for each of the nine 5-year periods from 1970 to 2014. While the number of absolute appearances in IB research articles has increased almost five-fold between the first and the last 5-year period, the portion of IB articles accounted for by authors affiliated with institutions from the USA declined steadily from 1980-1984 to 2010-2014, losing nearly 55 percent of their overall share (Figure 3). For the first time in 2013, Europe overtook USA in number of total appearances and has enjoyed the top position until 2014, the last year of our sample.

Table 1a. Canadian Institutions' Absolute Productivity, 1970-2014

		1970	1975	1980	1985	1990	1995	2000	2005	2010	
	1970-2014	1974	1979	1984	1989	1994	1999	2004	2009	2014	
1	U Western Ontario	150	1	1	7	13	19	27	17	33	32
2	York U	60	1	2	2	0	1	2	5	27	20
3	U Toronto	55	1	0	1	2	11	7	7	11	15
4	Simon Fraser U	50	0	0	6	1	5	7	8	14	9
5	McGill U	48	1	9	16	7	6	0	4	5	0
6	U Calgary	34	0	0	0	1	2	0	6	15	10
7	Carleton U	20	0	4	8	1	0	1	0	1	5
7	U British Columbia	20	3	0	2	3	0	1	6	1	4
9	U Alberta	19	1	3	1	2	0	0	1	4	7
9	U Victoria	19	0	0	0	0	0	0	4	8	7
11	Concordia U	18	0	0	6	1	1	2	4	1	3
12	Queen's U	16	1	1	1	0	0	1	1	5	6
13	Brock U	15	0	0	0	0	0	0	2	6	7
14	Dalhousie U	14	1	1	7	4	0	0	0	0	1
14	U Windsor	14	2	0	2	1	1	3	0	4	1
16	Wilfred Laurier U	12	0	0	0	5	5	0	0	1	1
17	McMaster U	11	0	4	1	2	0	0	1	1	2
18	U Ottawa	10	0	0	4	1	1	0	0	0	4
19	HEC Montreal	9	0	1	0	0	0	0	0	8	0
20	U Manitoba	7	0	0	1	0	0	1	0	1	4
21	Ryerson U	5	0	0	0	0	0	0	0	2	3
21	U Laval	5	0	0	0	0	0	3	0	1	1
23	U Guelph	4	0	0	0	0	1	0	2	0	1
23	U Saskatchewan	4	1	1	0	0	0	0	0	0	2
25	U Montreal	3	1	0	0	1	1	0	0	0	0
25	U Quebec	3	0	0	1	0	0	1	1	0	0
27	Acadia U	2	0	0	1	0	1	0	0	0	0
27	Laurentian U	2	0	1	1	0	0	0	0	0	0
27	Memorial U	2	0	0	0	0	0	1	0	0	1
27	Mount St. Vincent U	2	0	0	2	0	0	0	0	0	0
27	Sherbrooke U	2	0	1	1	0	0	0	0	0	0
27	U Lethbridge	2	0	0	0	0	0	0	0	2	0
33	Royal Military College	1	0	0	0	0	0	0	0	1	0
33	St. Francis Xavier U	1	0	0	0	0	0	1	0	0	0
33	St. Mary's U	1	0	1	0	0	0	0	0	0	0
33	U New Brunswick	1	0	0	0	1	0	0	0	0	0
33	U Ontario Inst. Tech.	1	0	0	0	0	0	0	0	0	1
33	U Regina	1	0	0	0	0	0	0	0	0	1
33	U Waterloo	1	0	0	0	0	0	0	0	1	0
33	U Winnipeg	1	0	1	0	0	0	0	0	0	0

Table 1b. Canadian Institutions' Adjusted Productivity, 1970-2014

		1970	1975	1980	1985	1990	1995	2000	2005	2010	
	1970-2014	1974	1979	1984	1989	1994	1999	2004	2009	2014	
1	U Western Ontario	73.72	1.00	1.00	6.50	8.67	8.75	11.83	8.67	13.94	13.37
2	McGill U	33.33	1.00	7.83	11.67	4.83	3.33	0.00	2.00	2.67	0.00
3	U Toronto	28.37	0.50	0.00	1.00	2.00	6.00	4.00	4.00	4.53	6.33
4	Simon Fraser U	26.07	0.00	0.00	5.00	1.00	2.25	3.53	5.33	6.30	2.65
5	York U	23.23	0.50	1.33	0.83	0.00	1.00	0.83	2.67	9.25	6.82
6	U Calgary	16.28	0.00	0.00	0.00	0.50	1.33	0.00	2.50	7.33	4.61
7	Carleton U	10.14	0.00	2.00	4.14	0.50	0.00	1.00	0.00	0.33	2.17
8	Concordia U	9.92	0.00	0.00	4.50	0.50	0.50	1.50	1.25	0.50	1.17
9	Dalhousie U	9.33	1.00	0.50	5.00	2.50	0.00	0.00	0.00	0.00	0.33
10	U Alberta	8.50	0.25	2.00	1.00	1.00	0.00	0.00	0.50	1.17	2.58
11	Wilfred Laurier U	8.00	0.00	0.00	0.00	4.50	2.67	0.00	0.00	0.33	0.50
12	U British Columbia	7.95	2.00	0.00	1.00	0.75	0.00	0.50	2.03	0.50	1.17
13	U Victoria	7.87	0.00	0.00	0.00	0.00	0.00	0.00	1.25	4.17	2.45
14	U Windsor	7.85	2.00	0.00	0.70	0.50	0.50	2.00	0.00	1.65	0.50
15	Queen's U	7.37	1.00	0.33	0.50	0.00	0.00	0.50	0.50	2.83	1.70
16	McMaster U	6.58	0.00	2.67	1.00	1.00	0.00	0.00	1.00	0.25	0.67
17	Brock U	5.83	0.00	0.00	0.00	0.00	0.00	0.00	0.67	2.67	2.50
18	U Ottawa	4.53	0.00	0.00	2.00	0.50	1.00	0.00	0.00	0.00	1.03
19	HEC Montreal	4.28	0.00	1.00	0.00	0.00	0.00	0.00	0.00	3.28	0.00
20	U Saskatchewan	3.33	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33
21	U Manitoba	3.12	0.00	0.00	1.00	0.00	0.00	0.50	0.00	0.50	1.12
22	Ryerson U	2.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.50
22	U Quebec	2.50	0.00	0.00	1.00	0.00	0.00	1.00	0.50	0.00	0.00
24	U Laval	2.17	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.33	0.33
25	Laurentian U	1.33	0.00	0.33	1.00	0.00	0.00	0.00	0.00	0.00	0.00
26	Sherbrooke U	1.25	0.00	0.25	1.00	0.00	0.00	0.00	0.00	0.00	0.00
26	U Guelph	1.25	0.00	0.00	0.00	0.00	0.33	0.00	0.75	0.00	0.17
28	U Montreal	1.17	0.33	0.00	0.00	0.50	0.33	0.00	0.00	0.00	0.00
29	Mount St. Vincent U	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
29	U New Brunswick	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
29	U Winnipeg	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
32	Acadia U	0.83	0.00	0.00	0.50	0.00	0.33	0.00	0.00	0.00	0.00
32	Memorial U	0.83	0.00	0.00	0.00	0.00	0.00	0.33	0.00	0.00	0.50
34	U Lethbridge	0.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.52	0.00
35	St. Francis Xavier U	0.50	0.00	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00
35	St. Mary's U	0.50	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
35	U Regina	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50
35	U Waterloo	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.00
39	Royal Military College	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00
39	U Ontario Inst. Tech.	0.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33

Table 2. Absolute and Adjusted Productivity by Region, 1970-2014

Region	Absolute Productivity		Adjusted Productivity	
Canada	657	6.17%	332.13	6.15%
USA	5,959	55.95%	3,247.86	60.13%
Asia-Pacific	1,343	12.61%	562.31	10.41%
Europe	2,461	23.11%	1,149.62	21.28%
Africa	26	0.24%	11.41	0.21%
Latin-America	67	0.63%	26.87	0.50%
Middle East	138	1.30%	71.36	1.32%
Missing	13		6.44	
Total	10,651		5,401.56	

Notes: Total and percentages do not include missing author affiliations.

Figure 1a. Absolute Productivity by Region, 1970-2014

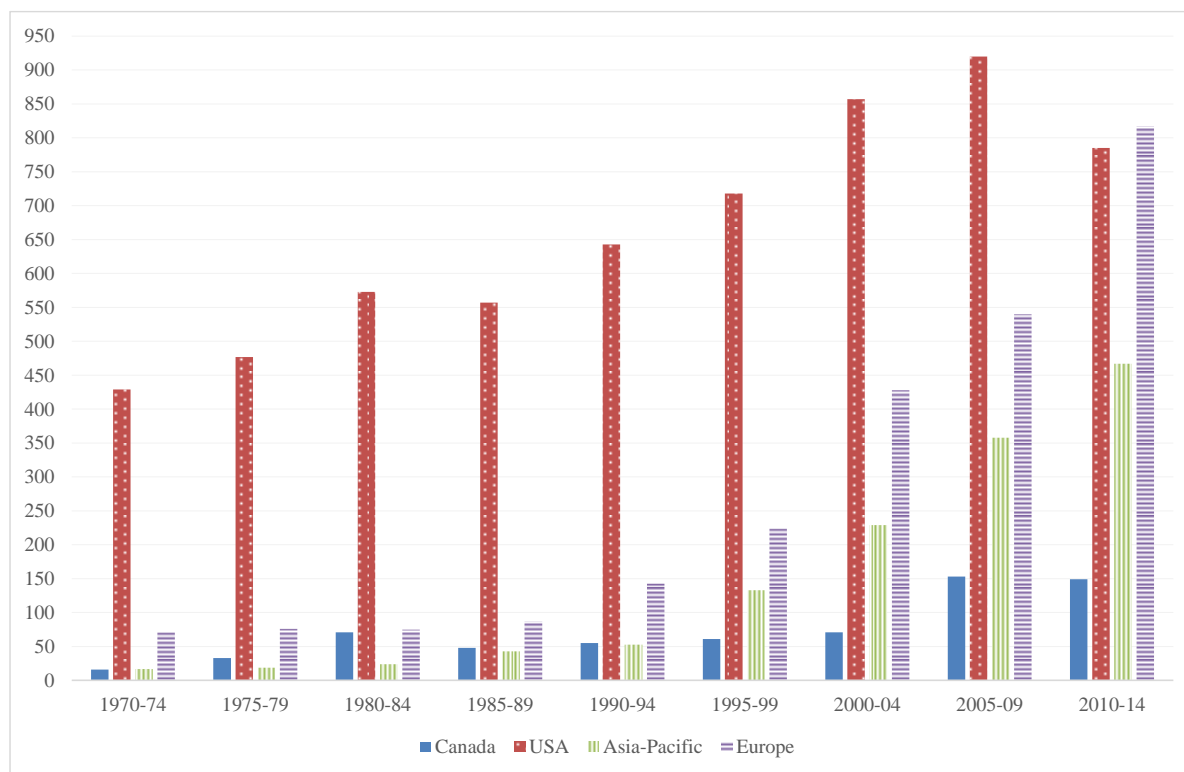


Figure 1b. Adjusted Productivity by Region, 1970-2014

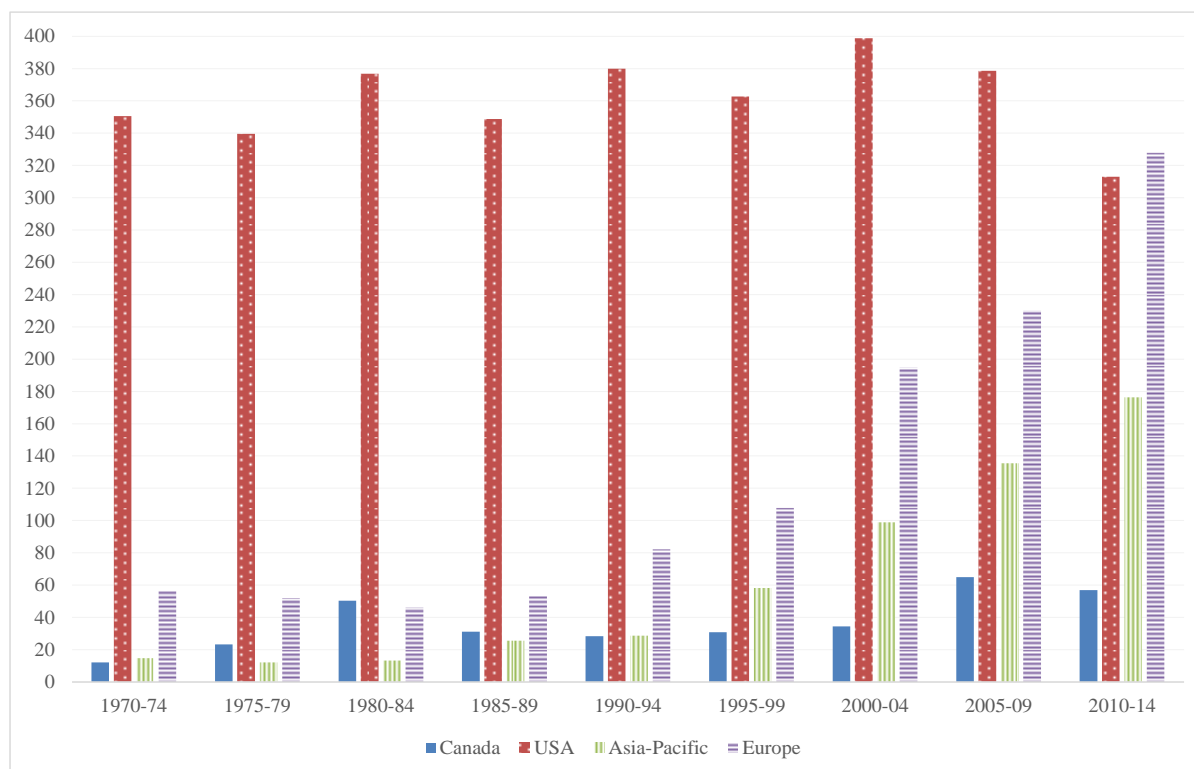


Table 3a. Research Performance by Region: Absolute Productivity, 1970-2014, in Articles and Percent

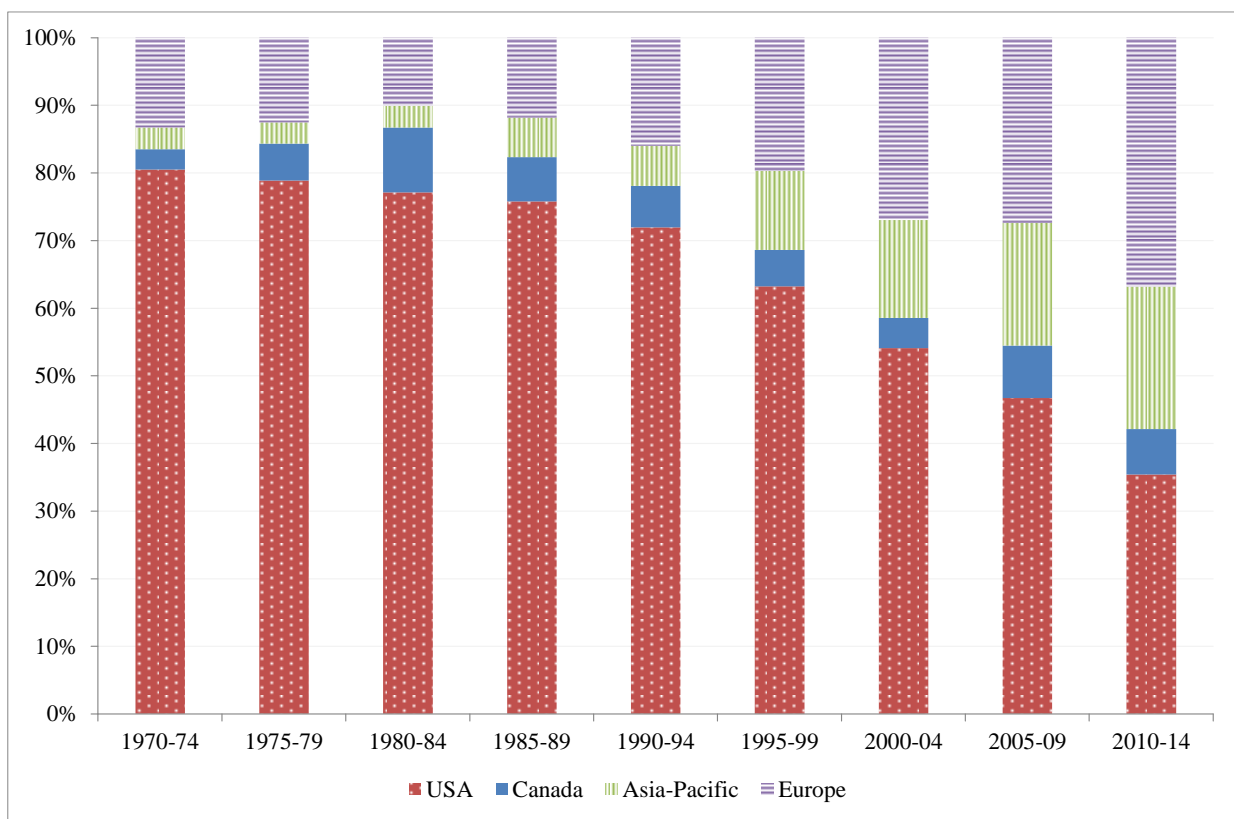
	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-14
Canada	16	33	71	48	55	61	71	153	149
	3%	5%	9%	6%	6%	5%	4%	8%	7%
USA	429	477	573	557	643	718	857	920	785
	79%	73%	74%	74%	71%	62%	53%	46%	35%
Asia-Pacific	17	19	24	43	53	133	229	358	467
	3%	3%	3%	6%	6%	11%	14%	18%	21%
Europe	71	76	75	87	143	224	428	540	817
	13%	12%	10%	12%	16%	19%	27%	27%	36%
Missing	2	2	1	0	0	0	0	3	5
TOTAL	542	649	770	751	909	1,158	1,606	2,005	2,261

Notes: Total and percentages do not include missing author affiliations.

A similar trend is evident for the level of publications when adjusted for multiple authorship (Table 3b). However, as research productivity moved outside of the USA, Canada initially benefited from an improved share of the output. Canadian institutions represented 10 percent of the total production in 1980-1984, a share that decreased to 7 percent in the following period and then to 5 percent until the 2000-2004 period, before subsequently rising again. After

1980-1984, Canada’s share remained within the range of 4 to 8 percent of the overall production of IB research, when assessed on both an absolute and an adjusted basis. In contrast, authors affiliated with Asia-Pacific and European institutions have been able to increase their share of the total production of IB research. Asia-Pacific institutions represented 3 percent of the total production in the first 3 periods; their share rose to 21 percent (20%) of the publications in the period 2010-2014 on an absolute (adjusted) basis. After declining from 1970-1979 levels, authors affiliated with European institutions gained over 25 percentage points of the absolute output of IB articles between 1980-1984 and 2010-2014, rising from 10 percent to 36 percent. Their rise on an adjusted basis (from 9 percent to 37 percent) approached 30% of the overall IB output. Gains in relative productivity by Asia-Pacific and European authors, were at the expense of authors affiliated with institutions from the USA.

Figure 3. Share of Absolute Productivity by Region, 1970-2014



Trends in Co-Authorship

An examination of research over time reveals a trend toward increased co-authorship. As shown in Table 4 and Figure 2, the average number of authors participating in a given publication is increasing over time, overall and across most regions and time periods. An independent samples *t*-test indicates that the number of authors per article between the 1975-1994 and 1995-2014 time periods has experienced a significant increase ($t_{(49)} = -3.68, p=0.0006$). This is not surprising, being consistent with calls for research based on multi-cultural teams and for increased collaboration in research, including internationally [31]. While the average number of co-authors is increasing for both the USA and Canada, authors from Asia-Pacific institutions have had the highest number of co-authors on average from 1976 onward with European authors

ranking second. This seems to suggest that increased collaboration among authors in European or Asian-Pacific institutions may be associated with their rise in overall rankings. Another interesting outcome is the drop on average co-authorship during 2010-2014 throughout the regions.

Table 3b. Research Performance by Regions: Adjusted Productivity, 1970-2014, in Articles and Percent

	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-14
Canada	12.08	23.25	50.34	31.08	28.33	30.87	34.45	64.89	56.83
	3%	5%	10%	7%	5%	5%	5%	8%	6%
USA	350.50	339.45	376.72	348.58	379.85	362.54	398.77	378.55	312.89
	80%	75%	75%	75%	72%	64%	54%	46%	35%
Asia-Pacific	14.67	12.03	13.14	25.42	28.57	58.16	98.80	135.35	176.17
	3%	3%	3%	5%	5%	10%	13%	16%	20%
Europe	56.25	51.85	45.90	53.08	82.08	107.80	194.57	229.95	328.14
	13%	11%	9%	11%	16%	19%	26%	28%	37%
Missing	2.00	0.67	1.00	0.00	0.00	0.00	0.00	1.02	1.75
TOTAL	440	454	503	467	526	566	735	821	889

Notes: Total and percentages do not include missing author affiliations.

Table 4: Average number of authors per paper, by region and time period, 1970-2014

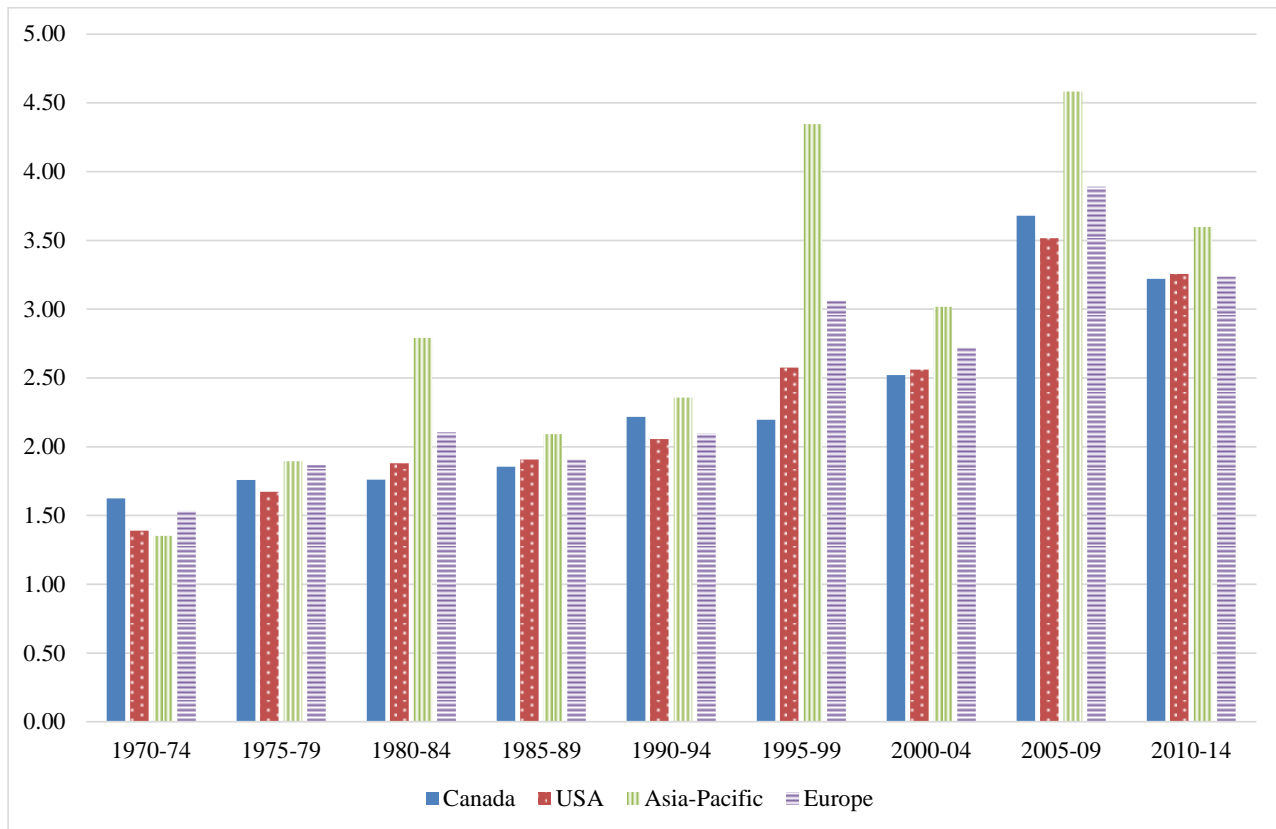
	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09	2010-14
Canada	1.63	1.76	1.76	1.85	2.22	2.20	2.52	3.68	3.22
USA	1.39	1.67	1.88	1.91	2.06	2.58	2.56	3.52	3.26
Asia-Pacific	1.35	1.89	2.79	2.09	2.36	4.35	3.02	4.58	3.60
Europe	1.54	1.87	2.11	1.91	2.10	3.06	2.72	3.89	3.24
Sub-Global	1.43	1.81	2.25	1.97	2.18	3.32	2.77	4.01	3.36
Global	1.56	1.87	2.23	2.17	2.21	6.86	2.83	6.95	4.89

Notes: Average does not include missing author affiliations. Sub-Global average excludes regions of Africa, Latin America, Middle-East, and Missing that in some years had an average that ranged from 8 to 18 authors.

Institutional Productivity: Rankings of the Most Productive Institutions Worldwide

Table 5 presents a ranking of the 25 most productive academic institutions worldwide, based on their absolute productivity. The number of institutions associated with authors publishing IB research in one of the 14 elite sample journals has risen significantly over time, growing from 69 in 1970 to 238 in 2014. A corresponding increase has taken place over time regarding the number of appearances required for an institution to qualify within the listing of the 25 most productive institutions. A total of 100 academic institutions worldwide made the Top 25 listings in at least one of the nine 5-year periods. Those institutions represent 8.5 percent of the 1,176 academic institutions whose affiliated authors have published at least one qualifying article during those 45 years.

Figure 2. Co-authorship Trends by Region, 1970-2014



Among those 100 institutions, only Harvard maintained its membership in the Top 25 for each of the nine 5-year periods. Harvard, which stands as the number one institution in terms of absolute productivity, not only ranks first for the entire 45-year period with 278 appearances but consistently maintained its membership among the elite institutions across all of the nine 5-year periods, with the lowest rank associated with Harvard being number 4 in the last period. Next in rank is the University of South Carolina, which maintained its position among the 25 most productive institutions in eight of the nine 5-year periods, a performance reflected in its overall number 3 ranking for the 45-year period. With 170 appearances, South Carolina's absolute productivity is significantly below Harvard's. The data show no comparable difference in absolute productivity between any other two consecutively ranked institutions. Seven other institutions ranked in the Top 25 during seven of the nine 5-year periods: University of Pennsylvania (with 173 appearances and ranked second overall), University of Western Ontario (150), INSEAD (136), Rutgers University (124), University of Michigan (117), New York University (115) and Indiana University (92).

As the results in Table 5 show, achieving a top position at one time does not guarantee a subsequent similar position and maintaining a top position over multiple time periods is particularly challenging. For instance, Columbia University, ranked 4th overall with a total of 158 appearances, ranked number 1st for the first 3 periods, 8th in period 4, 12th in period 5, and 25th in period 6. Columbia was subsequently never ranked among the 25 most productive institutions, ranking 73 in period 7, 127 in period 8, and 101 in period 9. The University of

Table 5. (Part 1) Rankings of the 25 Most Productive Institutions, 1970-2014, Overall and by 5-year Time Periods (Canadian Universities Highlighted)

1970-2014			1970-74			1975-79		
Rank	Institution	Abs	Rank	Institution	Abs	Rank	Institution	Abs
1	Harvard U	278	1	Columbia U	35	1	Columbia U	39
2	U Pennsylvania	173	2	Harvard U	22	2	Harvard U	30
3	U South Carolina	170	3	U Pennsylvania	17	3	Tel Aviv U	15
4	Columbia U	158	4	New York U	16	4	U Pennsylvania	14
5	U Western Ontario	150	5	UC Berkeley	11	5	U Hawaii	10
6	INSEAD	136	6	UC Los Angeles	10	5	U South Carolina	10
7	Rutgers U	124	7	Georgia State U	8	7	McGill U	9
8	U Michigan	117	7	Kent State U	8	7	MIT	9
9	New York U	115	9	IMEDE-IMD	6	7	New York U	9
10	Chinese U Hong Kong	109	9	MIT	6	7	U Washington	9
11	Copenhagen Business Sch.	95	9	Pennsylvania State U	6	11	Georgia State U	8
11	Michigan State U	93	12	Stanford U	5	11	U Georgia	8
13	Indiana U	92	12	U Kentucky	5	11	U Michigan	8
14	Northeastern U	85	12	U Michigan	5	14	Rutgers U	7
14	Texas A&M U	84	12	U Texas Austin	5	14	Temple U	7
16	U Leeds	82	12	U Wisconsin Madison	5	14	U Toledo	7
17	Pennsylvania State U	80	17	Manchester Business Sch.	4	17	Boston U	6
18	U Texas Austin	80	17	Colorado State U	4	17	U Texas Austin	6
19	Ohio State U	77	17	Indiana U	4	17	U Wisconsin Madison	6
20	U Hong Kong	73	17	Ohio State U	4	20	George Washington U	5
21	MIT	69	17	Sacramento State	4	20	Indiana U	5
22	U Uppsala	67	22	Friederich-Alexander	3	20	Saint Louis U	5
22	UC Berkeley	66	22	Centre D'etudes Industrielles Geneva	3	20	St. John's U	5
24	U Miami	64	22	Tel Aviv U	3	20	SUNY Buffalo	5
25	U Minnesota	63	22	U British Columbia	3	20	U Illinois Urbana	5
			22	American U	3	20	U Texas Dallas	5
			22	CUNY Baruch College	3			
31	York U	60	22	Cleveland State U	3	27	Carleton U	4
			22	Oklahoma State U	3	27	McMaster U	4
37	U Toronto	55	22	San Francisco St. U	3			
			22	Tulane U	3			
41	Simon Fraser U	50	22	U Chicago	3			
			22	U Illinois Urbana	3			
			22	Utah State U	3			

Table 5. (Part 2) Rankings of the 25 Most Productive Institutions, 1970-2014, Overall and by 5-year Time Periods (Canadian Universities Highlighted)

1980-84			1985-89			1990-94		
Ra nk	Institution	Ab s	Ra nk	Institution	Abs	Ra nk	Institution	Abs
1	Columbia U	37	1	U South Carolina	32	1	Harvard U	39
2	Harvard U	23	2	Harvard U	30	2	U South Carolina	27
2	U Pennsylvania	23	3	U Pennsylvania	25	3	INSEAD	23
4	MIT	17	4	U Michigan	22	4	U Pennsylvania	20
5	McGill U	16	5	New York U	20	5	U Western Ontario	19
5	New York U	16	6	INSEAD	15	5	Dartmouth College	19
5	Rutgers U	16	6	Pennsylvania State U	15	7	Pennsylvania State U	16
5	Southern Illinois U Carbondale	16	8	Columbia U	14	8	U Michigan	15
5	U Michigan	16	9	U Western Ontario	13	9	U Hawaii	14
10	U South Carolina	13	9	U Washington	13	10	UC Berkeley	13
11	Tel Aviv U	12	11	Northeastern U	12	11	U Texas Austin	12
12	U Southern California	11	11	U Texas Austin	12	12	U Toronto	11
13	INSEAD	10	13	U Illinois Urbana	10	12	Columbia U	11
13	Pennsylvania State U	10	14	Georgetown U	9	12	New York U	11
15	Ohio State U	9	14	Indiana U	9	15	U Bradford	10
15	U Texas Austin	9	16	Michigan State U	8	15	Georgetown U	10
17	Carleton U	8	17	Chinese U Hong Kong	7	17	MIT	9
17	CUNY Baruch Col.	8	17	McGill U	7	17	UC Irvine	9
17	Northeastern U	8	17	CUNY Baruch College	7	17	U Southern California	9
20	Dalhousie U	7	17	U Hawaii	7	20	Indiana U	8
20	U Western Ontario	7	21	National U Singapore	6	20	Rutgers U	8
20	Boston U	7	21	London Business Sch.	6	20	UC Los Angeles	8
20	Southern Methodist U	7	21	Manchester Business Sch.	6	20	U Toledo	8
20	U Washington	7	21	U Bradford	6	24	Tel Aviv U	7
25	Concordia U	6	21	Boston U	6	24	Michigan State U	7
25	Simon Fraser U	6	21	Texas A&M U	6	24	U Minnesota	7
25	Boston College	6	21	U Georgia	6			
25	George Washington U	6	21	U San Francisco	6	27	McGill U	6
25	Georgetown U	6						
25	Stanford U	6	29	Wilfred Laurier U	5			
25	U Toledo	6						

Table 5. (Part 3) Rankings of the 25 Most Productive Institutions, 1970-2014, Overall and by 5-year Time Periods (Canadian Universities Highlighted)

1995-99			2000-04			2005-2009		
Ra nk	Institution	Abs	Ra nk	Institution	Abs	Ra nk	Institution	Abs
1	Harvard U	31	1	Harvard U	42	1	U Western Ontario	33
2	U Western Ontario	27	2	INSEAD	33	1	Harvard U	33
3	Rutgers U	25	3	Chinese U Hong Kong	32	3	U Hong Kong	30
4	U Michigan	24	4	U South Carolina	30	4	U Miami	29
5	U Pennsylvania	23	5	U Pennsylvania	26	5	York U	27
6	Michigan State U	20	6	Northeastern U	25	6	Chinese U Hong Kong	26
7	U Texas Austin	19	7	U Hong Kong	24	6	U Leeds	26
8	Chinese U Hong Kong	16	8	Copenhagen Business Sch.	23	6	Michigan State U	26
8	New York U	16	9	U Leeds	20	9	Copenhagen Business Sch.	24
8	Texas A&M U	16	9	Rutgers U	20	9	Rutgers U	24
11	U South Carolina	15	11	Indiana U	19	11	Texas A&M U	23
12	INSEAD	14	12	Ohio State U	18	11	U South Carolina	23
13	Stockholm Sch. Economics	13	12	U Oklahoma	18	13	Indiana U	21
13	Georgetown U	13	14	U Western Ontario	17	14	City U Hong Kong	18
13	Indiana U	13	15	City U Hong Kong	15	14	Tilburg U	18
16	UC Berkeley	12	15	National U Singapore	15	16	INSEAD	17
16	U Oklahoma	12	15	London Business Sch.	15	16	Ohio State U	17
18	Temple U	11	15	New York U	15	16	U Minnesota	17
18	U North Carolina Chapel	11	15	U North Carolina Chapel	15	16	U Texas Dallas	17
20	Hong Kong U Science & Tech.	10	20	Stockholm Sch. Economics	14	20	U Calgary	15
20	Thunderbird Grad S	10	20	Michigan State U	14	20	Pennsylvania State U	15
20	U Minnesota	10	20	U Miami	14	22	Catholic U Louvain	14
23	Tilburg U	9	23	Temple U	13	22	U Uppsala	14
23	U Hawaii	9	23	U Maryland College Park	13	22	Erasmus U	14
25	U Hong Kong	8	23	U Michigan	13	22	London Business Sch.	14
25	Columbia U	8	23	U Utah	13	22	Simon Fraser U	14
25	Stanford U	8				22	Arizona State U	14
25	UC Irvine	8				22	Temple U	14
25	U Houston	8						
25	U Texas Dallas	8						
25	U Washington	8						
32	Simon Fraser U	7						
32	U Toronto	7						

Table 5. (Part 4) Rankings of the 25 Most Productive Institutions, 1970-2014, Overall and by 5-year Time Periods (Canadian Universities Highlighted)

2010-2014		
Rank	Institution	Abs
1	Copenhagen Business Sch.	43
2	U Western Ontario	32
3	U Uppsala	29
4	Erasmus U	28
4	Harvard U	28
6	U Leeds	27
7	Chinese U Hong Kong	24
8	Hanken School Economics	22
8	U Texas Dallas	22
10	U Sheffield	20
10	York U	20
10	Northeastern U	20
10	Rutgers U	20
10	U South Carolina	20
15	U Melbourne	19
15	U Queensland	19
15	INSEAD	19
18	Texas A&M U	18
19	City U Hong Kong	17
19	Michigan State U	17
21	U Sydney Australia	16
21	Beijing U	16
21	National U Singapore	16
24	Korea U	15
24	Helsinki Sch. Econ / Aalto	15
24	U St. Gallen	15
24	U Toronto	15

Michigan experienced similar challenges: with a total absolute productivity of 117 appearances, Michigan was part of the Top 25 for the first seven periods and then declined in rank to 48 in period 8, and 101 in period 9.

Other institutions have also emerged as serious contenders for the top positions. Most notably, an increasing number of universities from Europe and Asia-Pacific have earned spots in the top ranks. Copenhagen Business School first appeared in the 8th position during 2000-2004 but has since risen and obtained the top position in the period 2010-2014. Similarly, the University of Leeds first appeared in the Top 25 institutions for the first time in the period 2000-2004 at the 9th position and has risen to the 6th position in the subsequent two periods. The University of Hong Kong, which first earned a listing among the Top 25 institutions during the

period 1995-1999, reaching the 3rd position worldwide in the 2005-2009 period, but disappeared from the Top 25 rankings in 2010-2014. The Chinese University of Hong Kong, on the other hand, was number 17 in the period 1985-89 with 7 appearances, disappeared the following period, then reappeared and subsequently maintained its position among the 25 most productive institutions from the period 1995-1999 onwards. It achieved the 3rd place in the period 2000-2004 and stayed in the Top 10 rankings in the subsequent two periods.

The data further indicate that the overall proportion of qualifying publications associated with the top institutions has substantially diminished over time, indicating that the production of IB research is becoming increasingly fragmented across institutions. Table 6 shows that the Top 25 institutions were responsible for 42 percent of the total number of appearances in the first period, 1970-1974. This share remained similar until the period 1985-1989, after which it gradually decreased until 2010-2014, when the Top 25 institutions were producing only 27 percent of the total productivity. Each decade after the 1980s has witnessed an average decrease of approximately 7 percentage points of the production accounted for by authors affiliated with the Top 25 institutions.

Table 6. Share of the Top 25 Institutions in Overall Absolute Productivity, 1970-2014

	1970- 1974	1975- 1979	1980- 1984	1985- 1989	1990- 1994	1995- 1999	2000- 2004	2005- 2009	2010- 2014	Total 1970-2014
Overall absolute productivity	542	649	770	751	909	1,158	1,606	2,005	2,261	10,651
Absolute productivity by Top 25 institutions	229	252	355	335	350	435	516	577	602	3,651
Percentage	42%	39%	46%	45%	39%	38%	32%	29%	27%	34%

Conversely, the role played by authors from non-North American institutions in the production of IB research has dramatically increased, growing from 17.9 percent in 1970-1974 to 59 percent of the appearances in the 2010-2014 period (Table 3a). A similar trend is observed whereby the non-North American institutions included in the Top 25 are increasing their share of the total research production. During 1970-1989, this share was 3.8 percent, a level that gradually increased until 2010-2014, when non-North American institutions ranked in the Top 25 accounted for 15.9 percent of the total productivity. Previous studies have identified similar trends. For example, Lahiri and Kumar [11] also observed the progress made by non-US institutions, and particularly those located in Hong Kong. Overall, while the USA placed 61 institutions into the Top 25 ranking for the entire 45-year time period (Table 5), the number of top institutions from the USA has declined by more than half between 1970-1974 and 2010-2014, from 28 (of 34) to 7 (of 27). European institutions have recently been experiencing increased participation in the Top 25.

There were 4 European institutions ranking in the Top 25 in period 1, none in period 2, and only one in period 3. Thereafter, European institutions gradually increased their participation in the Top 25: 4 in period 4, 2 in period 5, 3 in period 6, 5 in period 7, and a high of 9 institutions in period 9. The rankings for the last period in our sample (2010-2014) show a remarkable result. Out of the 25 universities in the Top 25 institutions, only 7 universities are from the USA.

The majority are from Europe (9) and Asia-Pacific (8). In contrast, during the period 1990-1994 out of the 26 universities in the Top 25 institutions only 5 are non-US based (2 from Europe, 2 from Canada, and 1 from Israel).

Institutional Productivity: The Most Productive Canadian Institutions

For Canada, the University of British Columbia was in the Top 25 in the first period but never reappeared. Further, no single institution made it into the Top 25 for all of the remaining 8 time periods (Table 7). However, McGill placed in the Top 25 in period 2 (with Carleton and McMaster in the 27th position) and an all-time high of 6 in period 3 (McGill, Carleton, Dalhousie, Western Ontario, Concordia, and Simon Fraser). In the next two periods, only two Canadian institutions appear in the Top 25 list in each period (Western Ontario and McGill in period 4; Western Ontario and Toronto in period 5). In periods 6 and 7 only Western Ontario appears in the Top 25 institutions, but in period 8 there were 4 institutions (Western Ontario, York, Calgary, and Simon Fraser). In the final period of our sample, Western Ontario and York maintain their positions in the Top 25 list with Toronto reappearing in the 24th position.

Table 7. Canadian Institutions Ranking Among Top 25 Institutions Worldwide, 1970-2014

	1970- 1974	1975- 1979	1980- 1984	1985- 1989	1990- 1994	1995- 1999	2000- 2004	2005- 2009	2010- 2014
British Columbia	Yes	No	No	No	No	No	No	No	No
Calgary	No	No	No	No	No	No	No	Yes	No
Carleton U	No	No	Yes	No	No	No	No	No	No
Concordia U	No	No	Yes	No	No	No	No	No	No
Dalhousie U	No	No	Yes	No	No	No	No	No	No
McGill U	No	Yes	Yes	Yes	No	No	No	No	No
Simon Fraser U	No	No	Yes	No	No	No	No	Yes	No
Toronto	No	No	No	No	Yes	No	No	No	Yes
Western Ontario	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
York	No	No	No	No	No	No	No	Yes	Yes

Following is a brief analysis of the Canadian institutions that have been included among the Top 25 institutions in at least one 5-year time period. The cut-off for an author to be included in the Top 25 list was 3 publications per period until period 6 (1995-1996). It then increased to 5 publications per period for the remaining periods.

University of Western Ontario: Leveraging star performers to sustain Top 25 ranking.

The University of Western Ontario (renamed Western University in 2012) stands as a stable top institution worldwide in the production of IB research. This is reflected in its position as the number 5 most productive institution in the entire 45-year period, with 150 appearances (Table 5), and its status as the only Canadian institution to maintain a Top 25 ranking since the period 1980-1984. Western's ability to exhibit sustained strong performance reflects that institution's ability to hire a particularly high number of individually prolific scholars (Table 8). Western had a Top 25 author in every period since 1985. In period 1985-1989, it had both Top 10 (P. Beamish) and Top 25 (J. Geringer) authors, and this trend continued until 1999. Since 2000, Western Ontario had continuously a single Top 10 most productive author (P. Beamish each period).

Table 8. Performance of University of Western Ontario, 1970-2014

	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014
Rank top 25	-	-	20	9	5	2	14	1	2
Absolute prod	1	1	7	13	19	27	17	33	32
Adjusted prod	1.00	1.00	6.50	8.67	8.75	11.83	8.67	13.94	13.37
Average co-authors	1.00	1.00	1.14	1.77	2.37	2.41	2.18	2.68 ¹	2.67
Star Power: Top 10 author				P. Beamish ² (4/13)	A. Morrison ⁴ (4/19)	P. Beamish (7/27) J.M. Birkinshaw ⁵ (1/27) A. Delios ⁶ (3/27)	P. Beamish (11/17)	P. Beamish (13/33)	P. Beamish (13/32)
Star Power: Top 25 author				J. Geringer ³ (2/13)	P. Beamish (4/19) J. Geringer (3/19)	J. Anand (3/27) A. Morrison ⁷ (1/27)			

Notes:

- ¹ Excludes a publication with 49 authors as it otherwise biases this result
- ² P. Beamish had a total of 6 publications, 4 affiliated with Western Ontario and 2 with Wilfred Laurier
- ³ J. Geringer had a total of 3 publications, 2 affiliated with Western Ontario and 1 with Southern Methodist
- ⁴ A. Morrison had a total of 5 publications, 4 affiliated with Western Ontario and 1 with Thunderbird Graduate School
- ⁵ J.M. Birkinshaw had a total of 10 publications but only 1 affiliated with Western Ontario in this period
- ⁶ A. Delios had a total of 4 publications, 3 affiliated with Western Ontario and 1 with University of Hong Kong
- ⁷ A. Morrison had a total of 3 publications, 1 affiliated with Western Ontario and 2 with Thunderbird Graduate School

McGill University: Initially a high producer of IB research, but subsequent decline.

McGill was ranked as one of the most productive institutions worldwide for producing IB research during the initial periods of this study but failed to maintain this ranking. Beginning from a number 7 ranking in 1975-1979, and a number 5 position in 1980-1984, McGill declined to number 17 during the 1985-1989 period and did not subsequently rank among the Top 25 universities (Tables 5, 7 and 9). McGill achieved its best ranking in 1980-1984 with 16 author appearances, reflecting the effect of two Top 25 most productive authors (N. Adler and V. Errunza). McGill's adjusted productivity of 11.67 appearances in 1980-1984 is the second highest level achieved by any Canadian institution during any of the nine 5-year time periods examined, surpassed only by Western Ontario's in 1995-99, 2005-09, and 2010-14. Although McGill had a Top 25 author during 1990-1994 (N. Adler), this was not sufficient to earn a position among the Top 25 institutions. Overall, for the 45 years examined, McGill ranks second

in adjusted productivity but fifth in absolute productivity among Canadian institutions (Tables 1a and 1b).

Table 9. Performance of McGill University, 1970-2014

	1970- 1974	1975- 1979	1980- 1984	1985- 1989	1990- 1994	1995- 1999	2000- 2004	2005- 2009	2010- 2014
Rank top 25	-	7	5	17	-	-	-	-	-
Absolute prod	1	9	16	7	6	0	4	5	0
Adjusted prod	1.00	7.83	11.67	4.83	3.33	0.00	2.00	2.67	0.00
Average co-authors	1.00	1.33	1.63	1.71	2.00	-	2.50	2.20	-
Star Power: Top 10 author									
Star Power: Top 25 author		V.R. Errunza (3/9)	N. Adler (4/16) V.R. Errunza (3/16)		N. Adler (3/6)				

York University: Enhancing its position as an IB research producer.

York only gained membership among the Top 25 institutions during the last two periods examined, 2005-2014, but its entry in the ranking is remarkable: number 5 with 27 total appearances in period 2005-2009 and number 10 with 20 appearances in 2010-2014 (Table 10). York offers an interesting case whereby the emergence of two Top 50 most productive authors Y. Pan (4 articles) and P. Aulakh (3 articles) in 2005-2009 contributed in York obtaining the 5th position worldwide. However, as the productivity of other universities increased, it dropped to the 10th position in 2010-2014 still having a Top 25 author (P.Aulakh, 5 articles) and a Top 50 most productive author (Y. Pan, 4 articles). Thus, the entry of York in the Top 25 institutions is rather new and reflects productivity of authors beyond the single Top 25 contributor. Whether York can maintain this position will need to be confirmed in the institution's future rankings. Overall, for the 45 years examined, York ranks second on overall absolute productivity and fifth on adjusted productivity among Canadian institutions (Tables 1a and 1b).

University of Toronto: A complex example of the role of star authors.

The University of Toronto provides an interesting case regarding the influence of star authors on an institution's ability to achieve a top productivity ranking. Indeed, the highest rank obtained by this institution was in the 1990-1994 period, when Toronto was ranked 12th worldwide (Tables 5 and 11). During this period, Toronto had one author (A. Rugman) ranked among the Top 10 most prolific scholars and another author in the Top 25 (A. Verbeke). The University of Toronto disappeared from the Top 25 ranking in the subsequent three periods, although the university evidenced overall productivity that was generally increasing over time, as assessed on both an absolute and an adjusted basis (Tables 1a, 1b, and 11). This productivity increase enabled Toronto to regain membership to the Top 25 institutions in the last period, 2010-2014, when it ranked 24th with 15 appearances. It is worth noting that this high productivity was

Table 10. Performance of York University, 1970-2014

	1970- 1974	1975- 1979	1980- 1984	1985- 1989	1990- 1994	1995- 1999	2000- 2004	2005- 2009	2010- 2014
Rank top 25	-	-	-	-	-	-	-	5	10
Absolute prod	1	2	2	0	1	2	5	27	20
Adjusted prod	0.50	1.33	0.83	0.00	1.00	0.83	2.67	9.25	6.82
Average co-authors	2.00	2.00	2.50	-	1.00	2.50	2.20	3.56	3.45
Star Power: Top 10 author									
Star Power: Top 25 author							Y. Pan (5/5)		P. Aulakh (5/20)

not attributable to a single author, as only one Toronto author scored three articles, two authors scoring two articles each, and eight authors from 1 article each during this period. Overall, for the 45 years examined, Toronto ranks third on both absolute productivity and adjusted productivity among Canadian institutions (Tables 1a and 1b).

Table 11. Performance of University of Toronto, 1970-2014

	1970- 1974	1975- 1979	1980- 1984	1985- 1989	1990- 1994	1995- 1999	2000- 2004	2005- 2009	2010- 2014
Rank top 25	-	-	-	-	12	-	-	-	24
Absolute prod	1	0	1	2	11	7	7	11	15
Adjusted prod	0.50	0.00	1.00	2.00	6.00	4.00	4.00	4.53	6.33
Average co-authors	2.00	-	1.00	1.00	1.91	1.86	2.29	3.00	2.53
Star Power: Top 10 author					A. Rugman (5/11)	A. Rugman ¹ (2/7)			
Star Power: Top 25 author					A. Verbeke (3/11)				

Notes:

¹ A. Rugman had a total of 4 publications, 2 affiliated with Toronto and 2 with Oxford

Carleton, Dalhousie, and Simon Fraser universities: Varied performance over time.

Three additional Canadian universities – Simon Fraser University, Carleton University, and Dalhousie University – offer interesting cases from which additional insights can be developed.

Simon Fraser University offers an interesting case. It made it twice to the Top 25 ranked institutions (1980-1984, tied for 25th; and 2005-2009 tied for 22nd) and almost made it in 1995-1999 (tied for 32nd and needed one more article), as shown in Table 5. Simon Fraser also ranked highly overall among Canadian institutions: 4th on both absolute and adjusted productivity (Tables 1a and 1b). It has also shown a steady increase in absolute and adjusted productivity across the decades of this study, from zero publications in 1970-1979 to 23 total appearances in 2005-2014. Yet, no authors from Simon Fraser made it into the Top 25 authors during the period of this study.

Carleton University achieved a Top 25 ranking in 1980-1984 (tied for 17th place) and almost made it in 1975-1979 (tied for 27th) without having an author ranked among the Top 25 most prolific IB researchers during these time periods (Tables 5 and 7). After 1984, authors affiliated with Carleton had only a single qualifying IB publication for two of the next 4 periods and zero articles for the other two. It took until 2010-2014 to achieve 5 appearances in a single period. Carleton ranked 7th overall among Canadian institutions on both adjusted and absolute productivity (Tables 1a and 1b).

Dalhousie's appearance in the Top 25 during the period 1980-1984 was primarily the result of star power, as one author (A. Rugman) was responsible for 4 of the 7 appearances by Dalhousie during that time period. After this star author departed to join the University of Toronto in 1986, no other Dalhousie-affiliated author subsequently published an IB paper in one of the top 14 journals until one publication that appeared in 2010-2014. As a result, Dalhousie was tied for 14th on overall absolute productivity and was 9th in overall adjusted productivity among Canadian institutions (Tables 1a and 1b).

Calgary University first appeared in the Top 25 list in the period 2005-2009 with 15 appearances and ranking 20th overall. This entry in the most productive institutions, it can be attributed to a Top 10 author (A. Verbeke) that produced 10 articles during this period. However, in the next period Calgary's productivity dropped significantly to 10 articles from 6 authors and with no star power. Overall, Calgary ranked on the 6th place on both absolute and adjusted basis (Tables 1a and 1b).

Tables 1a and 1b show the absolute and adjusted productivity, respectively, of all Canadian institutions that had an affiliated author with at least one IB publication during the 1970-2014 time period. These tables show that some individual universities, beyond those discussed previously, evidenced reasonable productivity for one or more of the time periods under examination, although generally performance was one or less adjusted article per 5-year time period and performances beyond this level were generally not achieved and subsequently sustained across multiple time periods. Many institutions had two or more successive 5-year time periods in which no qualifying publications were achieved.

Discussion, Contributions, Limitations and Future Research

Economic globalization has emerged as a major factor influencing business within and between nations. The process of globalization is raising challenges and opportunities for developing the knowledge and skills required for promoting innovation and prosperity nationally and internationally. Research universities, such as those located in Canada, have an important role in creating, refining, disseminating, and helping to promote the exploitation of knowledge that will enable nations, their institutions, and their people to effectively perform in a globalizing world. To the extent that Canadian universities can embrace leadership roles as centers of

knowledge creation, Canada's potential internationally for attracting, developing, and retaining the leading students, scholars, and research programmes will be enhanced. Indeed, research productivity in leading journals is an important factor in an institution's ability to attract leading students and faculty, obtain funding for research undertakings, and achieve strong rankings in reputational assessments and accreditation reviews, among other important considerations [e.g., 9, 10, 11, 12, 13].

The ability of Canada and its people to prosper despite the changes associated with globalization represents an important challenge [5, 8, 31]. Reporting that globalization may be the most fundamental challenge impacting business education, the AACSB [1] calls for fundamental reconsideration of the role of international business (IB), including IB teaching and research. One means of assessment is evaluating the research productivity of academic institutions. This study's examination of institutional productivity may assist current or future scholars in decisions regarding where to pursue their graduate education or subsequent employment, provide insights into key sources of contributions to the field's development, identify important trends, and provide information useful to university administrators and other stakeholders – in Canada and abroad – in evaluating current or future allocation of resources.

An objective of this study was to assess institutional productivity of scholars from Canadian universities with respect to IB research over a 45-year period, 1970 to 2014. The study identified main trends in institutional productivity in the publication of IB research, both worldwide and with specific attention to the performance of Canadian universities. This includes a significant trend toward increasing co-authorship of articles, a development that was evident across time periods. The study contrasted performance of Canadian institutions versus institutions from the USA, Europe, and Asia-Pacific. Rankings of the most productive institutions worldwide were presented and discussed for the 45-year period ranging from 1970 to 2014, as well as for the nine 5-year time periods that comprised the overall study, enabling the identification of several key developments. Performance of Canadian institutions, overall and compared to counterparts from elsewhere in the world, was examined in greater depth. Canadian universities that achieved top rankings worldwide in the production of IB research were singled out for additional examination.

This study assessed IB research productivity using appearances of published works in leading journals. Any research study of this type is limited by the journals that are selected to comprise its sample. A contribution of this study, however, is that selection of journals is based on the acknowledged leading scholarly journal in IB, the *Journal of International Business Studies*, supplemented by 13 additional journals that were the most highly cited sources for articles published in *JIBS*. This approach allowed systematic incorporation of not merely IB-specific journals, but also general management journals and journals encompassing a variety of different business disciplines. The analyses examined institutional productivity not merely based on absolute appearances of authors in published papers, but also based on weighting reflective of co-authorship. Differences in outcomes based on these two approaches were presented and discussed. A further strength of this study is that it represents the entire population of IB articles for the examined journals for the 45 years studied, not merely a sample of such articles.

The analysis revealed that, while USA-based institutions continue to account for the largest portion of published IB research, the portion of articles accounted for by USA universities has declined over time. Canadian universities, while a limited player in the initial production of IB research, occupied a position second only to the USA during the early 1980s (Figures 1a and 1b). Although Canadian universities have also experienced a decline in their

relative productivity over time, particularly since their peak in the 1980-1984 period, the final decade examined in this study suggests that Canadian productivity may be experiencing a resurgence. Universities from the regions of Europe and Asia-Pacific have both surpassed Canada in terms of relative productivity, however, and the positive trend for both regions is greater than for Canada, with a particularly strong upward trend evident for European universities that have surpassed USA in the last period of our sample. This dispersion of productivity to non-North American universities may have important implications for the ability of Canadian and USA universities to remain favoured destinations for students, scholars, and major research initiatives in coming years, with corresponding implications for human capital development and economic prosperity.

In analyzing institutional productivity involving authors affiliated with academic institutions, this study also found several interesting results. The average number of authors per article has increased substantially over time and the portion of solo-authored papers declined, the latter from about 85% in 1970 to approximately 19% by 2014.

This study's findings also suggest that despite the increasing amount of space offered to IB research, both in IB-specialized journals and in journals that were either from other disciplines or of a more general business orientation, there appears to be increasing competitiveness for publishing IB papers. The number of different authors appearing per year has been increasing substantially and the number of publication appearances required for an institution to qualify as one of the most productive institutions has also increased. Achieving a ranking among the Top 5 or Top 10 most productive institutions evidences substantial volatility, and an increasing portion of the leading institutions is being comprised of non-North American universities, particularly those from Europe and the Asia-Pacific region. A declining proportion of overall research productivity is accounted for by the 25 top-ranked institutions, suggesting increasing fragmentation and broader competition across institutions worldwide for publication of IB research. While suggesting the potential opportunities for authors from a broader range of institutions to publish successfully in IB research, this trend toward increasing competition for publications raises important implications for public policy and institutional governance, including for the funding and prioritization of IB activities within and across Canadian universities.

Among Canadian universities, only one has sustained a position among the Top 25 most productive institutions worldwide, both overall and across seven of the nine 5-year time periods examined in this study: The University of Western Ontario. Western achieved the 5th highest ranked position worldwide for the overall 45-year period, an accomplishment reflecting its success in attracting a particularly high number of individually prolific scholars. Next is York, which ranked two times among the Top 25 institutions and obtained the 30th place worldwide for the studied period. Eight other Canadian universities were able to achieve a Top 25 ranking for one or more 5-year time period, including McGill, Toronto, Simon Fraser, Carleton, Calgary, Dalhousie, Concordia, and British Columbia. However, only McGill and Simon Fraser achieved this status more than once. Canada evidenced a decline from a high of 6 Canadian universities being listed among the Top 25 most productive institutions to one or two universities in the Top 25 thereafter. One exception is the 2005-2009 period, where 4 Canadian universities made it to the Top 25 but this was short-lived as in the next period only 3 Canadian universities made the list.

This decline is interesting, because on a collective basis, Canadian MBA programmes ranked by the *Financial Times* [32] experienced a decline in rankings compared to counterparts

from abroad between 2001 and 2015. While 9 Canadian schools were ranked among the Top 100 MBA programs worldwide in 2001, between 2007 and 2015 only 5 or 6 Canadian universities achieved that ranking per year. In addition, the average rating for the top 3 ranked Canadian MBA programs moved from 30.3 out of 100 in 2001, to a high of 23rd place in 2003, before subsequently declining dramatically to an average of 73.3 out of 100 for 2015. Research productivity is only one component of the *Financial Times*' ranking system and these changes in rankings undoubtedly reflect many factors beyond the IB research productivity reported in this study. Nevertheless, changes in the research productivity of Canadian business schools have an important relationship with their international ranking and reputation in studies such as those conducted by the *Financial Times*. This highlights the importance of examining institutional research productivity, such as conducted in this current study, but also suggests the potential value of future research examining this and related areas.

The globalization of academic research and publication carries within itself dynamics that may lead eventually to a recalibration of issues and methods within the realm of IB research. As scholars and teachers in emerging and non-North American regions join the global "tent" of academic research and publication, they will challenge the prevailing paradigms and institutions of both relevant subject matter and research methods that emerged under the aegis of North American academic leadership [33]. The critical importance of economic globalization and its effects on the level of prosperity of nations and their people cannot be ignored. Drawing from the recommendations of the AUCC [8, 31], Universities Canada [5], and others, it is essential that public policy makers, academic administrators, and other university stakeholders undertake necessary efforts to ensure that Canadian institutions and their affiliated authors remain active and relevant in producing and publishing leading research, including within the realm of international business.

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Appendix 1:

Definition of International Business Research

International business research is defined by Nehrt *et al.* (1970), and repeated by Ricks (1985: 1), as: “scholarly investigation and/or analysis of a subject that meets the following criteria”:

1. It is concerned with firm-level business activity that crosses national boundaries or is conducted in a location other than the firm’s home country. (This activity may be the movement of goods, capital, people, and know-how, or it may be manufacturing, extraction, construction, banking, shipping, advertising, and the like.)

2. It is concerned with the interrelationship between the operations of the business firm and international or foreign environments in which the firm operates.

3. It does not include studies devoted to economic development, development planning, foreign trade, and the international monetary system, which belong to development and international economics. Excluded also are studies of foreign legal, political, economic, and social environments. These belong to the fields of law, political science, economics, and behavioral science unless the study itself relates the environment directly to the organizational, operational, or decision-making problems of international business firms.

4. It does not include studies of business activities in given foreign countries. A study of marketing channels in Turkey, whether it be done by a U.S., French, or Turkish professor of marketing, is still a study about domestic business in Turkey. This would not be international business any more than would the study of motivation levels of Portuguese workers or the study of personal income distribution in Japan, even though each may be of interest to international business firms.

5. As an exception to point 4, however, *comparative* business studies are included within this definition. For example, a study of pharmaceutical marketing channels in Germany, Italy, Brazil, and Japan, which makes comparisons and analyzes the causes and effects of similarities and differences, would be considered international business research even though it was not concerned with the relationship between the marketing channels within each country and international business firms.”