Regional stickiness of novel ideas in the scholarly international business community

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Abstract

Purpose – The purpose of this paper is to investigate the geographic dissemination of work in International Business (IB) by investigating the extent to which research topics tend to see mostly local use – with authors from the same geographic region as the article identified by the topic model as the first article in *JIBS* building on the topic – vs global use – where topics are used by authors across the world.

Design/methodology/approach – Topic modeling is applied to all articles published in the *Journal of International Business Studies* between 1970 and 2015. The identified topics are traced from introduction until the end of the sampling period using negative binomial regression. These analyses are supplemented by comparing patterns over time.

Findings – The analyses show strong path dependency between the geographic origin of topics and their spread across the world. This suggests the existence of geographically narrow mental maps in the field, which the authors find have remained constant in North America, widened yet are still present in East Asia, and disappeared in Europe and other regions of the world over time. These results contribute to the study of globalization in the field of IB, and suggest that neither a true globalization nor North American hegemony has occurred in recent decades.

Originality/value – The application of topic modeling allows investigation of deeper cognitive structures and patterns underpinning the field, as compared to alternative methodologies.

Keywords International business, Topic modelling, Knowledge diffusion, Cross-cultural comparisons, Mental maps

Paper type Research paper

Introduction

The academic world has gone through an impressive internationalization process (Cantwell *et al.*, 2014, 2016; Cantwell and Brannen, 2016). More and more author teams consist of researchers from different countries, with the field of International Business (IB) leading the forefront in this regard (Cantwell *et al.*, 2016). Indeed, the IB field has an especially high proportion of scholars with experience in multiple disciplines and countries (Cantwell and Brannen, 2011). By its very nature, the field of IB is a prime candidate to be a leading force in creating an international, global scholarly community. To achieve this, Thomas *et al.* (1994, p. 685) have argued that the field "must continue to expand its geographical horizons and define new frontiers for research. It must globalize our mental maps."

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In spite of this impressive internationalization, a significant body of work also finds that IB phenomena tend to be studied mainly from a North American perspective, being evaluated in terms of their conformity to US standards, and hence pre-empting the emergence of a "truly global perspective" (Shenkar, 2004, p. 165). Most research in IB is conducted in the USA or countries similar to the USA, and the strongest predictor of a country's inclusion in a study is its US trade ranking (Thomas *et al.*, 1994). Similarly, Vernon (1994, p. 227) notes that "U.S. history, values, and institutions continue inescapably to dominate our thinking and narrow our vision." – begging the question whether IB's mental maps have truly globalized, or whether institutionalization of North American-influenced research has further narrowed them (Shenkar, 2004).

Building on the idea that "text can be treated as traces of an author's world view, preserved to a point in time and immune to retrospective construction" (Barley *et al.*, 1988, p. 27), we offer a novel exploratory approach to this important question by modeling authors' mental maps through their writing and topics of interest. Rather than stopping at descriptive information such as author origins or countries under study, we delve deeper into the substantive content of work by applying topic modeling (Blei, 2012) to analyze the geographic origin and subsequent spread of topics in the *Journal of International Business Studies* (*JIBS*) (as a representation of mainstream IB work) during the period 1970–2015. Here, we follow Chabowski *et al.* (2010, p. 925), who pose that by studying "the most influential topics in an academic community, a more complete understanding of its social structure can be discussed as a basis for future theory development."

We find that the mental maps of IB scholars are narrow in their geographic focus, but that this is not specific to North American scholarship. While North American scholars rely predominantly on topics that originated in North America, East Asian scholars likewise rely mostly on topics originating from East Asia. In contrast, European scholars do not exhibit such general geographic patterns in their topic usage. Investigating how these tendencies have changed over time, we find evidence of a widening of the mental maps of authors in East Asia, Europe and countries outside the three major regions, but that the regional use of North American research topics is essentially unchanged over time.

This study offers three core contributions. First, it yields new insights regarding the extent to which the field of IB has (not) internationalized along a novel dimension: researchers' mental maps as captured by the topics they pursue. Second, we lay bare unobserved tendencies present in the field, where neither true globalization nor pure convergence to North American dominance seems to have occurred, as scholars' work diffuses mostly in their home region. Third, we introduce a novel methodological tool – topic modeling – offering great opportunities for the linguistic turn in IB research (Brannen *et al.*, 2014; Kobayashi *et al.*, 2018). In all, these findings place particular emphasis on stimulating cross-cultural collaboration between scholars from different regions to overcome latent tendencies underpinning the field of IB.

Topic modeling mental maps of authors and topics in IB

As we are interested in studying the globalization of mental maps of IB scholars, we focused our sampling and coding efforts on one of the main outlets in the field that has been argued to be representative of ongoing research in the field, as well as being an integrator of IB research: *JIBS* (Cantwell and Brannen, 2016). We first manually coded the location of the primary affiliation at the time of publication of all 2,868 authors who published an article longer than five pages between its founding in 1970 until the end of 2015 (1,525 articles in total). In cases where author affiliation information was unavailable (often the case for the initial years of *JIBS*), we consulted online biographies to complete these data. For the sake of parsimony, we then clustered these affiliations to four focal geographic regions: East Asia, Europe, North America and other countries[1].

To create our model of IB research, we analyze the full-texts of the 1,525 articles in our sample using topic modeling (Blei, 2012; Blei *et al.*, 2003; Mohr and Bogdanov, 2013), which provides a machine learning procedure for coding the content of a collection of texts into a set of substantively meaningful categories – topics (Mohr and Bogdanov, 2013). Because topics are assigned to articles based on the core content of the articles, this enables us to identify and count articles that truly built upon a topic. The data-driven nature of the topic model is also attractive in that it operates independently from our own mental maps, which may in and of themselves shape or even bias our assessment of important research topics and articles in IB.

We use Latent Dirichlet Allocation (LDA) (Blei *et al.*, 2003), which attempts to uncover the unobserved topic structure that most likely generated the observed data (see also Mohr and Bogdanov, 2013, for an intuitive discussion of this method), with the basic intuition being that words more often used together are more likely to belong to the same topic than words that are rarely used together. Each document is viewed as a "bag-of-words" that is produced according to a mixture of topics, and each topic is itself a distribution over all observed words. We clean our data by removing terms that appear fewer than 50 times in total or in fewer than ten documents (see, e.g. Blei and Lafferty, 2007, for a similar practice), leaving a vocabulary of 9,934 unique terms and a total of 6,217,182 terms across all documents.

The crucial choice in LDA is the number of topics that needs to be identified by the algorithm, which has to be fixed before estimation by the researcher. However, there are no hard rules for deciding on the optimal number of topics (Chang *et al.*, 2009), such that we follow recent recommendations (Blei and Lafferty, 2007; Hall *et al.*, 2008) and set the number of topics at 100 (see also Haans, 2019; Kaplan and Vakili, 2015). To ensure that this number provides the best fit to our data, we also estimated models with 50, 75, 125 and 150 topics, and evaluated the models based on the topics' words and the articles assigned to them. This iterative process is detailed in Appendix 1 and clearly confirm 100 topics as providing the best fit. As shown below, our key results are robust to other topic numbers. This number also strikes a balance between the number of topics (providing sufficient observations for subsequent statistical analysis) while not spreading the data too thin in terms of the articles that can be assigned to every topic (such that we have sufficient variation in our dependent variables).

Topics in *JIBS*, 1970–2015

Table I contains the topics identified by the 100-topic model. To trace geographic patterns, we focus on the origins of these topics and their subsequent use, such that we identified articles that first used a given topic based on the highest topic weight assigned to every article. As shown in Table I, we are able to label the vast majority of topics emerging from the model in a straightforward manner. In fact, we observe only one topic that we are entirely unable to label, and three topics that appear to be a mix of multiple topics. We also identify three clearly empirical topics (related to, for instance, general measurement issues). Throughout the remainder of this article, we report results with these seven topics excluded, but all identified patterns are entirely robust to their inclusion.

Although it is not our intention to offer a comprehensive model of the field, the face validity of the topic list reported in Table I appears high in terms of both completeness and variation. Of course, the model may not identify certain research topics that some view as important ("all quantitative models of language are wrong – but some are useful"; Grimmer and Stewart, 2013, p. 269), but we anticipate that any systematic patterns would likely be attenuated by misclassification by introducing a certain degree of randomness to the model. To provide a more holistic overview of this model of IB research, we continued by applying multidimensional scaling to the topic model (Sievert and Shirley, 2014). The result of this

No.	Origin	Label	Top 5 words	Year
1	NA	Foreign policy	countries, government, foreign, policy, investment	1970
2	NA	Exchange rates	exchange, rate, rates, foreign, currency	1970
3	NA, EA	IB education	business, international, education, schools, students	1970
4	NA	Disclosure practices	accounting, companies, disclosure, financial, practices	1970
5	NA	FDI	firms, foreign, firm, domestic, size	1970
6	OT	Consumers/brands	consumer, consumers, brand, products, country	1971
7	NA	Management and control	managers, control, management, company, companies	1971
8	NA	Offshoring practices	labor, production, union, unions, offshore	1971
9	NA	Financial planning	financial, percent, foreign, planning, companies	1971
10	NA	Exporting and importing	trade, exports, export, innovation, import	1972
11	NA	International trade	countries, country, data, international, trade	1972
12	NA	Differences in values	managers, values, management, differences, study	1973
13	EU	Marketing strategies	market, product, marketing, markets, strategy	1973
14	EU	Exporting	export, exporting, firms, exporters, studies	1974
15	EU	International business	business, international, research, new, world	1974
16	NA	Licensing/tech transfer	technology, licensing, patent, rights, transfer	1974
17	NA	Finance	debt, financial, financing, capital, ratio	1974
18	NA	Culture	culture, people, business, cultural, new	1975
19	EU	Risk reduction	risk, market, returns, stock, political	1976
20	NA	International trade	trade, percent, countries, united, west	1976
21	NA	Institutions	institutional, economic, systems, business, press	1976
22	EU	Strategic management	management, strategic, business, process, managers	1977
23	NA	Theory of the firm	theory, international, firm, firms, business	1980
24	NA	Six sigma adaptation	adaptation, six, sigma, crossborder, practice	1980
25	NA	FDI	investment, foreign, international, countries, country	1981
26	NA, EU	Values and identification	identification, organization, values, organizational, lean	1981
27	NA	Marketing channels	relationship, performance, channel, marketing, commitment	1982
28	EA	Ownership/performance	firms, performance, firm, board, ownership	1982
29	NA	Purchasing	suppliers, supplier, new, automotive, supply	1982
30	NA	Hofstede's dimensions	culture, cultural, national, hofstede, values	1983
31	NA	Cross-cultural research	cultural, research, studies, culture, management	1983
32	NA	Negotiations (in China)	negotiations, chinese, negotiation, business, negotiators	1983
33	NA	Global strategy	global, strategy, strategic, business, integration	1984
34	OT	Japan/Korea	japanese, japan, firms, management, korean	1984
35	NA	India	industry, firms, indian, india, transparency	1984
36	NA, EU	Diversification-performance	diversification, firm, performance, international, firms	1985
37	NA	Entry mode choice	entry, mode, choice, modes, foreign	1986
38	NA	Job satisfaction	satisfaction, job, leadership, employees, organizational	1987
39	NA	Expatriate adjustment	expatriate, expatriates, adjustment, international, career	1989
40	NA	FDI	fdi, investment, host, direct, foreign	1989
41	EU, OT	CSR	csr, social, corporate, firms, stakeholder	1990
42	NA, EU, EA	IB journals	international, business, research, journals, management	1991
43	EA	Joint ventures	joint, ventures, venture, control, partners	1991
44	EU	Chinese market	local, china, chinese, foreign, market	1991
45	NA	Innovation / Patents	patent, innovation, technological, patents, knowledge	1992
46	NA	IJVs	ijv, ijvs, partners, partner, control	1992
47	EA	Internationalization	internationalization, international, firms, firm, foreign	1993
48	NA	Chinese values	values, chinese, hong, kong, china	1993
49	NA	HRM practices	practices, employees, human, management, hrm	1994
50	NA	Target-acquirer	acquisitions, target, acquisition, firms, acquirers	1994
51	NA	Knowledge transfer	knowledge, transfer, social, management, international	1994
52	NA	Real options	affiliates, affiliate, growth, uncertainty, options	1994

Table I.
Topics discussed in *JIBS*, their origins and their founding years

(*continued*)

No.	Origin	Label	Top 5 words	Year
53	NA	Banking and finance	banks, bank, foreign, banking, international	1995
54	NA	Trust	trust, relationships, partners, business, international	1996
55	NA	TCE	governance, opportunism, contract, relational, contracts	1996
56	NA	Corruption	corruption, countries, international, business, government	1996
57	NA	Learning and experience	experience, international, jvs, learning, business	1996
58	NA	International growth	economic, business, growth, development, international	1996
59	NA	MNCs	mncs, mnc, business, value, management	1996
60	NA	Location decisions	location, firms, locations, geographic, cities	1998
61	NA	Global climate change	environmental, mindset, global, climate, change	1998
62	NA	Strategic alliances	alliance, alliances, international, strategic, partners	1998
63	NA	Spillover effects	productivity, foreign, firms, spillovers, fdi	1999
64	NA	Cultural/social values	cultural, social, values, psychology, behavior	1999
65	NA, EA	Internationalization	international, internationalization, business, internationalisation, market	1999
66	EU	Learning	knowledge, learning, organizational, capabilities, international	1999
67	NA	Services	service, services, clients, client, global	2000
68	NA, OT	Elections / Politics	election, business, elections, country, france	2000
69	NA, EU, EA	Cultural distance	distance, cultural, international, differences, business	2001
70	NA, EA	International law	financial, law, countries, index, variables	2001
71	NA, OT	Family firms	firms, corporate, family, firm, governance	2002
72	NA, EU	Foreign entry	firms, entry, foreign, country, firm	2002
73	NA	MNC-subsidiaries	subsidiary, subsidiaries, parent, mnc, headquarters	2002
74	NA	Political power	political, power, conflict, bargaining, project	2002
75	NA, EA	MNEs	mnes, mne, international, subsidiaries, new	2003
76	EU	Transitions and change	management, business, transition, studies, research	2004
77	NA	Born-globals	international, firms, business, performance, internationalization	2004
78	NA	Regional strategies	regional, region, regions, global, rugman	2004
79	NA	Culture	international, culture, business, values, global	2004
80	NA, OT	Plants and production	plant, costs, production, knowledge, local	2004
81	NA, EU	Emerging markets	markets, emerging, business, strategy, international	2004
82	NA	SOE privatization	state, ownership, privatization, research, schemes	2004
83	NA	Network studies	network, ties, firms, networks, innovation	2004
84	EU	Entrepreneurship	entrepreneurs, entrepreneurship, entrepreneurial, social, business	2005
85	NA	Financial markets	bond, rating, sovereign, spreads, institutional	2005
86	NA	Venture capital	venture, investment, capital, firms, iso	2006
87	NA	Language	language, english, international, linguistic, team	2006
88	NA	Women studies	gender, women, model, female, ikea	2006
89	NA	SOEs in China	soes, state, government, chinese, ownership	2007
90	OT	Home country effects	firms, effects, industry, country, home	2008
91	NA	Institutions	institutional, institutions, firms, business, international	2008
92	NA	Governance	activity, foreign, activities, governance, business	2010
93	NA	Accounting	firms, information, earnings, accounting, foreign	2011

Note: Seven topics are not shown due to them being either purely empirical or of low quality

Table I.

exercise is shown in Figure 1, which also shows the location of the authors first using the topic in *JIBS* at the time of publication (the labels in this figure correspond to the list in Table I). Larger circles indicate that the topic has seen more use in the journal, as a whole, while the relative proximity between topics represents how similar they are in their terms.

Figure 1 paints a picture of a relatively fragmented field, consistent with recent descriptions of IB research (Buckley *et al.*, 2017), as no single topic is especially prominent and because no strong clustering can be identified either based on topic content or on geographic origin. Although suggestive of North American dominance in terms of author teams first utilizing a specific topic (81.72 percent of these topics had at least one

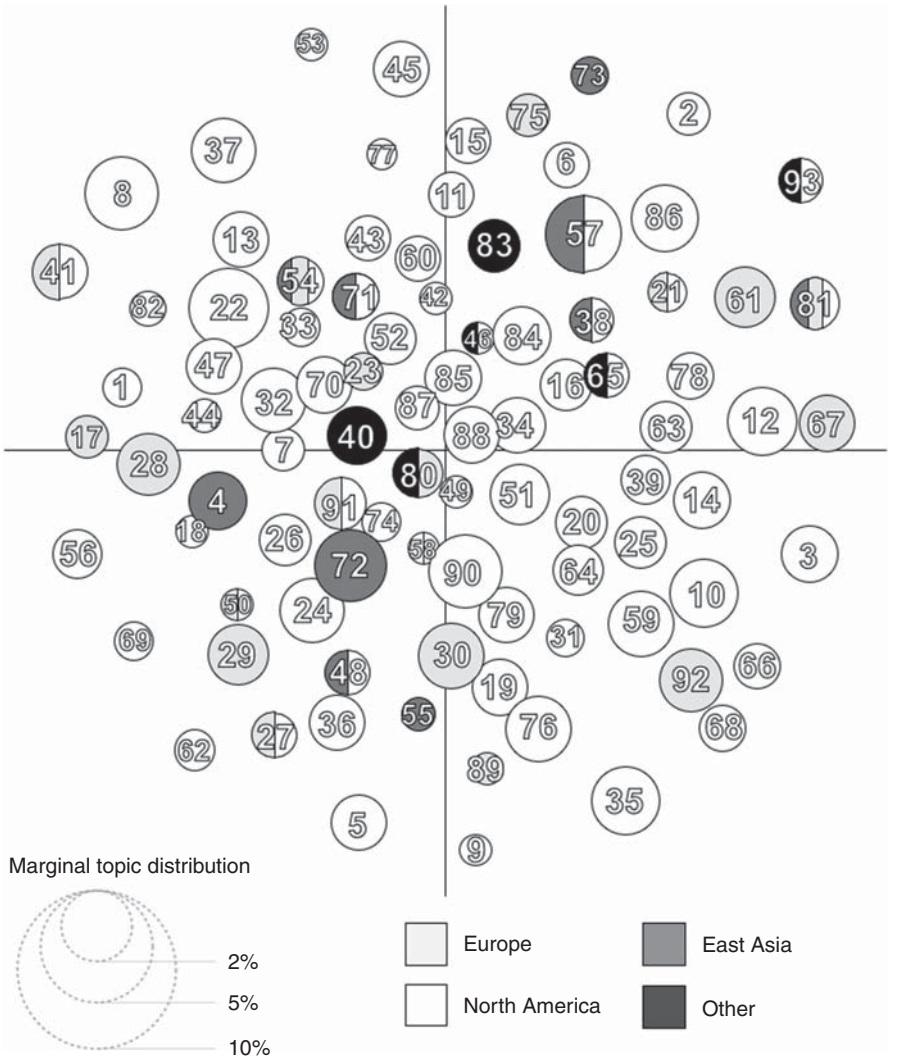


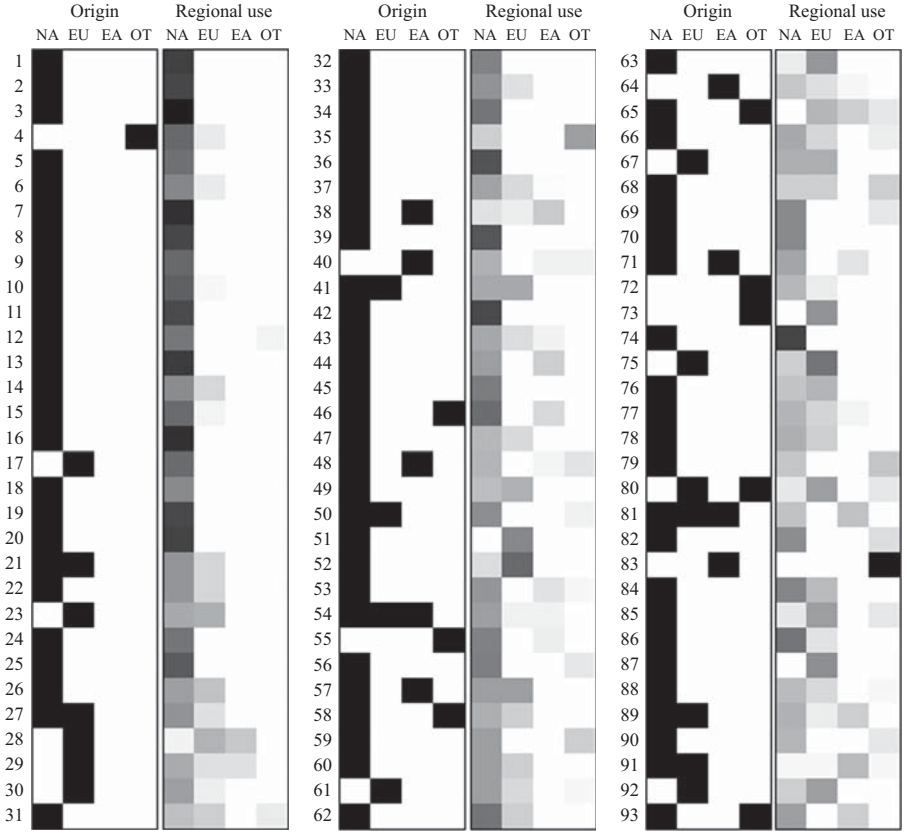
Figure 1.
The landscape of international business topics

North American scholar first using it, vs 19.35 percent with at least one European scholar, 9.68 percent with at least one East Asian scholar and 9.68 percent with at least one scholar from one of the other countries), it is nevertheless clear that topics in IB research largely represent more or less specialized pockets of knowledge – also evident by the impressive variety of subject areas and phenomena that the topics from Table I describe. We return to the potential implications of this field structure after further delving into the geographic patterns of topic usage in the field.

In order to get an initial impression of how topics that saw first use in a specific region do or do not see subsequent use across the world, we continued by counting the total times each topic appeared as a primary topic in the articles published in *JIBS*, and then separated this count into the four regions based on the affiliation of each author in the team – excluding the first use in *JIBS* from these counts to prevent potential inflation.

Figure 2 is the result of this exercise, with the left panels showing the origin of each topic via black squares, and the right panels representing a heatmap based on the subsequent use of the topics in each region. We divide each region's use counts by the total number of times the topic was used to allow for comparisons between more and less popular subject areas. The darker the cells in the right panels, the more frequently articles were published in *JIBS* by authors from that specific region, relative to the total use of the topic.

Although this figure admittedly does not provide very precise insights into topics' origin and subsequent use, it is suggestive of some degree of regional stickiness – as topics seem to get used by scholars that are of the same region where the topic first saw use[2]. This is particularly evident for the earliest topics in *JIBS*, where the vast majority of topics originated in North America and also were used predominantly by North American scholars, yet even seems present in later years (where a greater diversity of nationalities has published in *JIBS*, to start): the left and right panels are rather similar. For example, topic 71 (family firms) first saw use by a team of North American and European scholars, and was subsequently also mainly used by scholars from these regions. As such, this figure provides some evidence against a globalization of authors' mental maps as topics seem to mostly see local use. Nevertheless, we are cautious to draw stronger conclusions about these patterns, as this figure is unable



Note: Darker values indicate more regional use, relative to total topic use

Figure 2.
Comparison of IB topics' origins and subsequent use

to provide more statistically informed insights, is unable to account for potentially confounding effects of important variables, and is not able to correct for the high baseline levels of North American scholarship in the field that may in- or deflate the patterns shown in the figure. To therefore determine whether or not geographic patterns suggested by these figures are potentially the result of chance or driven by other factors than the origin of these topics, we turn to regression-based analysis.

Regression analyses

We continue by analyzing the origin and spread of topics and their usage across the four regions using negative binomial regressions that link the geographic origin of a research topic to its region-specific usage. We take as our unit of analysis the topic founding article, to allow us to control for potential article-level confounding variables. This results in a sample of 101 articles that were classified as the first to use a topic (some topics were first used by multiple articles in the same issue of *JIBS*). We have four focal outcome variables: "Topic usage in East Asia," "Topic usage in Europe," "Topic usage in North America" and "Topic usage in other countries." The main variables of interest to our regression models are whether or not the topics have an "East Asian origin," "European origin," "North American origin" and "Other origin." Teams in which the authors are spread across multiple regions are assigned to each of these regions.

The different types of geographic topic usage are all of a count nature and exhibit overdispersion (Greene, 2008). Therefore, we model our outcome variables using the negative binomial regression method. We follow recommendations for the interpretation of effects in such models by reporting and testing for differences in average predicted topic usage for each of the different region groups (i.e. predicted topic usage given individual values for all articles, averaged at the level of each respective region; cf. Greene, 2008), in addition to coefficient estimates for all our models. We report robust standard errors for all models.

In order to better isolate our effects of interest, we control for a variety of potentially confounding variables. For instance, scholars from high-status universities may be more well-known in the field, and their scientific discoveries may therefore disseminate more widely in the field such that we include whether or not any of the article's authors is affiliated to one of the 56 universities that were ever ranked in the top-25 universities in the full UT Dallas Ranking (Top 25 affiliated). We include the "Percentage of female authors," as work conducted by female authors may be received differently in different areas of the world (Larivière *et al.*, 2013). We also control for the number of authors ("One author" [baseline], "Two authors," "Three authors," and "Four-plus authors") as larger teams have more opportunities to spread their work.

We also include log-transformed "Number of pages" and "Title length" (in characters), as these may be related to capturing and keeping audience attention (Stremersch *et al.*, 2007), and "Article impact" in terms of Google Scholar citations up to and including 2015 to proxy for the topic founding article's inherent quality (taking the natural logarithm plus one to correct for skewness). Similarly, we control for the "total usage" of each topic to ensure that our outcome variable is capturing region-specific usage, rather than more general, worldwide usage patterns. We also control for whether or not the article appeared in a "Special issue," because these serve a tailored purpose in the dissemination of new research (Olk and Griffith, 2004). We additionally coded whether or not the topic was "internationally focused," as such topics may have wider applicability, and classified whether or not the topic was anchored in a specific country or region. As we found that only Asian countries were dominant, we label this variable "Asia-focused." Finally, we add year dummies in three-year increments because some articles were the only founding article in their year of publication, to control for time of publication effects. Table AI shows descriptive statistics and bivariate correlations for all our variables.

Results

Table II reports the results of our negative binomial regressions, where Model 1 focuses on topic usage by East Asian scholars, Model 2 by European scholars, Model 3 by North American scholars, and Model 4 by scholars located elsewhere. Given the non-linearity underpinning these models and to more precisely interpret our effects, we compute average predicted topic usage for topics from each focal region and compare this with average predicted topic usage for topics originating anywhere else in the world – shown in Table III[3].

On average, predicted topic usage of East Asian topics by East Asian scholars equals 3.89, while predicted East Asian topic usage for topics originating elsewhere equals 1.61 (the difference between these values is statistically significant: $\chi^2[1] = 25.78$, $p = 0.000$). In other words, East Asian scholars' mental maps seem geographically limited, as they build upon East Asian topics 2.42 times more often than topics originating from outside East Asia. In contrast, we find no evidence of differential topic use in Europe (4.19 vs 3.72, $\chi^2[1] = 0.99$, $p = 0.320$). North American scholars use North-American topics 1.54 times more often than topics originating elsewhere (10.63 vs 6.89, $\chi^2[1] = 49.44$, $p = 0.000$). Finally, scholars from the other regions use topics from these regions 0.75 times *less* than topics from one of the three major regions (1.29 vs 1.73, $\chi^2[1] = 7.00$, $p = 0.008$).

We engaged in several robustness analyses to confirm these patterns, reported more in depth in Appendix 3. Specifically, we show that results for the three major regions persist when estimating either a 75- or 125-topic model, when including a dummy variable for

	M1: topic usage in East Asia	M2: topic usage in Europe	M3: topic usage in North America	M4: topic usage in other countries
East Asian origin	0.58 (0.26)*	−0.20 (0.26)	−0.13 (0.16)	0.96 (0.27)***
European origin	−0.08 (0.29)	−0.43 (0.24)****	−0.03 (0.13)	0.00 (0.35)
North American origin	−0.32 (0.30)	−0.31 (0.23)	0.06 (0.12)	−0.04 (0.22)
Top 25 affiliated	0.12 (0.23)	−0.03 (0.15)	0.09 (0.07)	0.54 (0.24)*
Percentage female authors	−0.82 (0.36)*	−0.21 (0.25)	0.13 (0.16)	0.45 (0.30)
Two authors	0.49 (0.38)	0.60 (0.27)*	0.01 (0.10)	−0.38 (0.30)
Three authors	−0.07 (0.24)	−0.20 (0.18)	−0.03 (0.10)	0.77 (0.26)**
Four authors	0.00 (0.26)	−0.05 (0.18)	−0.09 (0.09)	−0.23 (0.23)
ln(Nr. of pages)	0.37 (0.26)	−0.08 (0.31)	−0.08 (0.13)	0.10 (0.24)
ln(Title length)	0.06 (0.30)	−0.14 (0.29)	0.08 (0.18)	−0.38 (0.43)
ln(1+Article impact)	0.17 (0.09)****	0.12 (0.06)	−0.01 (0.02)	0.19 (0.09)*
Total usage	0.05 (0.02)**	0.05 (0.01)***	0.05 (0.00)***	0.02 (0.02)
Special issue	−0.28 (0.29)	−0.02 (0.18)	0.22 (0.11)****	−0.45 (0.24)****
Internationally focused	−0.06 (0.20)	−0.39 (0.17)*	−0.11 (0.07)****	0.57 (0.22)*
Asia-focused	0.35 (0.25)	−0.49 (0.26)****	0.16 (0.18)	−0.35 (0.36)
Intercept	−2.66 (1.40)****	−0.50 (1.05)	1.76 (0.48)***	−4.21 (1.38)**
Wald χ^2	277.54***	220.48***	1,071.65***	203.11***

Notes: Robust standard errors in parentheses. Topic usage excludes founding articles. No. of observations (101) is the number of unique articles that were first in *JIBS* to use one of the 93 topics shown in Table I– with some topics first being used by multiple articles in the same issue of *JIBS*. Baseline for region comparison is "other countries." *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.1$ (two-tailed)

Table II. Results of negative binomial regression

	Model 1: East Asia	Model 2: Europe	Model 3: North America	Model 4: Other
Topic from same region	3.89	4.19	10.63	1.29
Topic from elsewhere	1.61	3.72	6.89	1.73
Difference $\chi^2[1]$ (p)	25.78 (0.000)	0.99 (0.320)	49.44 (0.000)	7.00 (0.008)
Ratio	2.42	1.13	1.54	0.75

Table III. Predicted usage of topics for each of the regions

multi-regional teams, and when replacing the origin variables for the region where the authors' highest degrees were obtained – but that the pattern for the "other" region disappears in these four analyses. All patterns remain when excluding future work by the authors first using the topic in *JIBS*, and also when removing all topics that were founded before 1980. Results are also unchanged when separating the UK from the remainder of Europe, where we identify strong use of UK topics by UK scholars. We also controlled for whether or not the authors in our regression sample moved to another region *vis-à-vis* future or past publications, yet patterns suggest that inter-region mobility of authors is not confounding our effects. Finally, controlling for the number of times the articles were cited by scholars in each focal region did not alter our results, suggesting that the identified patterns are distinct from citation-based patterns.

To examine if and to what extent the above topic usage patterns have changed over the years, we re-ran exploratory regression models after adding interaction terms between the three region dummies and an indicator of whether or not the topic founding article originated before 1992 or not. This year lies in the middle of the 1970–2015 time period and is, incidentally, the median year of topic founding in our data (such that about half of the topic founding articles were published before 1992). We report average predicted usage counts for each of the models in the two time periods in Table IV (full regression tables on which these calculations are based are reported in Table AII).

Several patterns emerge. First, East Asian topics founded before 1992 were used 4.64 times more often by East Asian scholars than topics founded anywhere else during this period, whereas this ratio decreased to 1.75 in the recent time period (the difference between these ratios is significant: $z = 4.09$ with $p = 0.000$). In other words, the regional stickiness of East Asian research topics appears to have diminished, yet is still present to a significant degree. Next, we find that in the pre-1992 period European research topics were used significantly more often by Europeans than non-European topics (1.67 times more), such that European topics originating from this time period appear to be regionally sticky. However, Europeans used European topics founded in 1992 or after 0.7 times less than non-European topics (the difference between these two ratios is statistically significant: $z = 3.48$ with $p = 0.001$) – a sign of a globalizing mental map. This also explains the lack of any geographical pattern in the total period, as the two opposite effects may have canceled each other out. Then, North American scholars used North American research topics 1.39 and 1.36 times more often in the two periods (this difference is far from statistically significant: $z = 0.13$ with $p = 0.898$), such that the North American mental maps remained stable. Finally, whereas scholars from the other countries used topics from these countries 0.11 times less than those from the three major regions in the pre-1992 period, this ratio increased to 0.93 for topics founded in or after 1992 (the difference between these ratios is significant: $z = -6.31$ with $p = 0.000$), which suggests a trend toward a more balanced mental map in this part of the scholarly IB community.

Discussion and conclusion

We set out to assess the extent to which the mental maps of researchers in IB have (or have not) expanded in conjunction with the increasing globalization of the field. While IB scholars indeed come from increasingly diverse disciplines and regions of the world (Cantwell *et al.*, 2014, 2016), by investigating the topics that researchers publishing in *JIBS* investigate we find that many mental maps of IB scholars remain substantially narrow in their geographic focus, as much research takes place in the same region in which the topic first saw use. Our regression models show that scholars in North America rely 1.54 times more often on topics that originated in North America, while East Asian scholars build 2.42 times more frequently on topics that emerged in East Asia. Although these patterns have persisted over time for North American scholars, we do find evidence that East Asian mental maps have

	Model 1: East Asia		Model 2: Europe		Model 3: North America		Model 4: Other	
	Pre-1992	Post-1992	Pre-1992	Post-1992	Pre-1992	Post-1992	Pre-1992	Post-1992
Topic from same region	7.00	3.00	6.14	2.61	15.45	5.68	0.19	1.58
Topic from elsewhere	1.51	1.71	3.68	3.75	11.14	4.18	1.75	1.69
Difference $\chi^2[1]$ (p)	81.60 (0.000)	5.29 (0.021)	8.01 (0.005)	6.61 (0.010)	31.84 (0.000)	5.33 (0.021)	77.15 (0.000)	0.38 (0.536)
Ratio	4.64	1.75	1.67	0.70	1.39	1.36	0.11	0.93
Wald z (p)	4.09 (0.000)		3.48 (0.001)		0.13 (0.898)		−6.31 (0.000)	

Notes: Wald z tests whether or not the pre- and post-1992 ratios are significantly different from one another. We focus on comparison of ratios rather than comparisons of absolute differences, as pre-1992 articles have had more time to accumulate topic usage. The more meaningful comparison lies in differences in the relative usage, rather than absolute differences, between time periods

Table IV.
Results of pre- and post-1992 comparison of predicted usage

widened (with the ratio shrinking from 4.64 for East Asian topics that emerged pre-1992 to 1.75 for those that emerged post-1992). Interestingly, European topics that emerge before 1992 were used 1.67 times more often by European scholars, yet those that emerged after 1992 were used less often by Europeans (0.70 times). Scholars from outside the three major reasons relied substantially less often on pre-1992 topics that emerged from outside their own regions (0.11 times), yet also here we observe a more balanced pattern of topic usage in more recent years (with authors being about as likely to rely on a topic from their own region as on a topic from the three major regions, post-1992).

These exploratory analyses confirm and expand upon the trend identified by Thomas *et al.* (1994) that North America had left a significant mark on the mental map of IB scholars. Though, indeed, a narrow focus on North American research persists, especially so in the first years of *JIBS*' publication, we also find that such a regional focus is not specific just to North American scholarship. Similar narrow foci exist or have existed in the different geographic communities in the field. Therefore, we offer evidence neither of globalization, nor of convergence toward North American dominance, where improvements in communication and transportation technology increasingly lead to similarity to work from this region (Shenkar, 2004). Rather, our results suggest strong and persistent fragmentation into regional communities, each with their own dominant topics seeing mostly local use – more akin to the regional multinationals of major interest to IB research (Rugman, 2005; Rugman and Brain, 2003), with work within a topic diffusing mostly in scholars' home region in spite of the increasingly international nature of academia.

The question remains why scholarship remains so regionally sticky in so many regions. Considering the patterns emerging from Figure 2 and our regression models with the structure of the field as identified based on Table I and Figure 1, it seems that the general fragmentation of the field may offer a key explanation. Indeed, we noted how not a single topic appears to be dominant in the field, and that no strong, higher-order clusters of knowledge (either geographically or in topical terms) could be identified based on Figure 1. Other work investigating the state of the field, focusing predominantly on the topical or phenomenological side, has yielded similar observations – noting that the field "does not have one prevailing paradigm, as it embraces multiple theories and approaches" (Acedo and Casillas, 2005, p. 633), with research streams in IB being "inward-looking and self-referential" (Buckley *et al.*, 2017, p. 1046).

We suspect that this fragmentation of the field both drives and is driven by the geographic patterns that we have identified. Building on the above metaphor of the regional multinational, perhaps some home-region advantages (or tendencies) exist that are more pronounced in the regions that we observe to be regionally sticky, such that specific regions are particularly suitable for investigating important phenomenon of interest to the field of IB. In turn, this may lead to these research streams increasingly deepening and fragmenting from other perspectives, while work from outside the regions faces a lack of either the resources, capabilities or motivation to publish work within these streams. Of course, future research is needed to further explore this tentative explanation.

Although such specialization may result in the accumulation of the regional know-how ("the understanding of different national environments and their cultural, religious, political and economic variations and their correlates"; Shenkar, 2004, p. 168) identified as a core competency of the field, our analyses provide an important caveat to this through the identification of clusters of regional knowledge. These clusters of knowledge appear to be specific to – but not necessarily about – the different regions under study, and our results show that these clusters have developed rather isolated from one another. In our view, this has important implications for our understanding of phenomena in the field, as IB research is inherently one that crosses disciplines and levels of analysis, implying that any single perspective is thus sensitive to a variety of alternative

explanations (Cuervo-Cazurra *et al.*, 2016). In other words, although the identified specialization into narrower research domains may be valuable in some sense, the fact that these research topics appear to be predominantly studied from a single regional perspective implies that much may be lost, in the process. Therefore, it may be high time to reconsider the extent to which the theories that have been developed predominantly from a singular geographic lens do or do not apply when taking epistemological perspectives from other regions (Li, 2016; Stahl *et al.*, 2017).

Taken as such, our results are consistent with recent calls for a greater internationalization of IB research (Cantwell *et al.*, 2014, 2016). Indeed, our results suggest that – with the increasing diversity of novel topics emerging from a variety of regions in more recent years – the degree to which topics fail to spread has diminished (though not disappeared). We anticipate that, as the internationalization of the field continues to increase, these widening of our mental maps will continue as well. Here, we mirror Shenkar's (2004) call to balance the global and local requirements of the field, as aiming exclusively for globalization runs the risk of losing the richness of region-specific knowledge. To us, this suggests a greater need for alternative perspectives for existing work in research topics – most likely to be attained via cross-cultural collaboration in IB research – as well as recombinatory effects that bring together a wider range of insights from different regions (rather than only theoretical perspectives) in the pursuit of grand questions (Buckley *et al.*, 2017). Among IB scholars, inherently, there is a rich understanding of the potential benefits of cross-cultural work, yet it seems that there remains much to be gained in our own work in crossing both theoretical and geographic boundaries.

Several strategies can be used for inter-regional and cross-cultural research by both IB researchers and institutions in the field, such as the AIB, alike. For researchers, we recommend the seeking of new subject locations that allow effective further theory development by offering an environment that is different from the one in which a given topic was originally developed (Boddewyn, 1999). Similarly, cross-theory and cross-region application and comparison of extant theoretical perspectives (Child *et al.*, 2003) may help move the field forward by blending and extending specialized, otherwise locally embedded, knowledge. The list of topics and their origins – and proximity to other topics – presented in Figure 1 and Table I may prove as a valuable starting point to identify neighboring perspectives. Researchers can also gain by joining global gatherings such as the annual meetings of the AIB to disseminate their work to scholars from other regions, while also being exposed to their work to widen their mental maps. Institutions – both professional associations and universities – could support such activities by establishing collaborations with institutions from other regions and by fostering inter-region mobility of their constituents. In our view, such strategies could enable researchers to be exposed to knowledge from other regions, without needing to sacrifice their local knowledge in the process.

This study provides a complementary perspective to prior accounts of the development of the field over the years. Our work is especially closely related to recent bibliometric and other network analyses of the IB literature (Chabowski *et al.*, 2010, 2013), which similarly offer opportunities to quantitatively model fields of study. However, large-scale bibliometric research typically requires the identification of influential work based on impact, from which networks are then constructed (Chabowski *et al.*, 2010), or requires focusing on work around a more narrowly defined concept (Chabowski *et al.*, 2013). Topic modeling supplements this approach by offering a way to identify novel research, relatively independent of the subsequent impact the research left on the field. By prioritizing the essential content of the articles, topic modeling also minimizes confounding effects of superficial reference to other work. At the same time, bibliometric approaches enable more explicit tracing of citation chains over time, whereas topic modeling precludes tracking whether one article indeed builds on another article or whether both articles simply work

within the same general topic. Clearly, each approach has its distinct (dis)advantages, and work combining these methodologies stands to offer valuable new insights into the development of the knowledge structures underpinning the field.

Of course, because we study just one journal (*JIBS*), we cannot truly claim that we examine IB scholarship in general. Much goes on in other journals (inside and outside specialized IB outlets), including *CCSM*, at conferences, through books, etc. However, notwithstanding this disclaimer, we believe our findings may well be generalizable beyond *JIBS* alone for at least two reasons. First, *JIBS* is the major outlet in IB, with an impressive advance over all other IB journals. Thus, we may expect that the majority of the key new ideas in IB are launched or introduced in *JIBS*, rather than in another outlet. Second, and more importantly, our aim is to investigate (changes in) regional stickiness of research topics in IB scholarship, rather than providing an exhaustive list of all topics ever studied in IB. For this, our sample of all articles ever published in IB's main journal should suffice. Nevertheless, these patterns may be more or less pronounced – or even different – when taking into account other journals, such that broader investigations would be valuable in coming to a deeper understanding of the mental maps in IB.

Another caveat worth emphasizing is that we only studied published work. This implies that we are unable to assess to what extent scholars from other regions try – but fail – to publish work on topics not from their home regions (as region-specific assumptions, practices and vocabularies may make it harder to publish on topics from outside one's own region). In any case, we can and do not conclude that regionally sticky topics are not of any interest or irrelevant to scholars or audiences outside their location of origin. Instead, we can only conclude that work on a topic predominantly gets published by scholars from the same region that it was first used in. It would be highly interesting to delve deeper into the mechanisms that determine what practitioners and scholars alike choose to read and use in their own work. Are educational programs anchoring future IB practitioners and scholars to read work that emerged from their own regions? Indeed, when replacing scholars' location of their highest degree with their affiliation at time of publication, we found strong evidence of geographic stickiness for all three major regions (rather than only East Asia and North America; see the Appendix for a discussion of this robustness check). Would a more balanced palate both in terms of topics and geographic regions of origin lead to wider mental maps? In any case, the role of education in shaping our own and our students' mental maps is not to be underestimated[4].

To conclude, with the ever-increasing multinational nature of scholarship, now seems the perfect time for researchers to widen their mental maps without giving up the specialized, region-specific knowledge that they have built. We agree with recent assessments that "IB scholars require a widening, rather than a narrowing, of their theoretical and epistemological horizons" (Buckley *et al.*, 2017, p. 1061). This study has offered another important dimension along which such a widening is required: the geographical. We argue that, for IB research to develop such widened theoretical horizons, further work crossing regional boundaries is required. Of course, such cross-cultural work will not be without its challenges, yet we can only echo Shenkar's (2004, p. 166) statement that the "real challenge […] is integration, something that IB is especially suitable to address."

Notes

1. The following countries are allocated to East Asia: China, Hong Kong, Japan, Korea, Macau and Taiwan. The following countries are European: Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Ireland, Italy, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Russia/USSR, Slovenia, Spain, Sweden, Switzerland, the Ukraine and the UK. The North American countries are Canada and the USA. All remaining countries are allocated to the "Other" category.

2. Simple t-tests of regional use confirm that North American ($p = 0.007$), European ($p = 0.018$) and East Asian ($p = 0.005$) scholars use topics more often when they first emerged in their own region. However, we do not find such a difference for scholars in the other countries ($p = 0.985$).
3. We compare articles from the focal region and articles originating from anywhere else (as a whole) because comparing each region would encompass six comparisons per model – greatly increasing the probability of false positives. The statistical patterns that emerge when conducting these comparisons are consistent with the more general comparisons reported in the paper. These full comparisons are available from the authors.
4. We appreciate an anonymous reviewer for pointing us in this direction.

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Appendix 1. Topic model evaluation

After estimating topic models with 50, 75, 100, 125 and 150 topics, we first attempted to label each topic solely based on its most important words. Then, we turned to the topic founding articles, being the first article in the set to have the focal topic as its primary topic of discussion, to ensure that there was a close match between the topic label and the topic of the founding article. We then did the same for a random selection of articles that are assigned to the topics. Where necessary, we updated the topic label or classified the identified topic as incoherent when mismatches between topics and articles were evident.

During this process, we also counted the number of topics that appeared to be mixtures of two or more seemingly separate topics (so-called "chimera topics"; cf. Schmidt, 2012). For instance, one such

chimera in our final model has amongst its most important words "internet," "terrorism," "tax," "ecommerce," "web" and "penalty." Its topic founding article is "A Survey of Corporate Programs for Managing Terrorist Threats" (Harvey, 1993), and articles that are classified as belonging to the topic included "Terrorism and International Business: A Research Agenda" (Czinkota *et al.*, 2010) and "Another Day, Another Dollar: Enterprise Resilience Under Terrorism in Developing Countries" (Branzei and Abdelnour, 2010) – which both clearly fall within the purview of the founding article and topic – yet also articles such as "Is eCommerce boundary-less? Effects of individualism-collectivism and uncertainty avoidance on Internet shopping" (Lim *et al.*, 2004) and "Profiles of Internet buyers in 20 countries: Evidence for region-specific strategies" (Lynch and Beck, 2001), which clearly do not fall within the theme of the topic founding article. As about half of the assigned articles to this topic were clearly about the Web whilst the other half of the assigned articles to this topic were clearly about terrorism, this topic was classified as a chimera.

In all, our coding exercise clearly points to 100 topics as providing the best fit to our data, as it has the highest degree of sensible topics (93.0 percent vs 72.0, 81.3, 84.8 and 84.7 percent for the models with 50, 75, 125 and 150 topics, respectively), as well as the lowest number of chimera topics (2.0 percent vs 18.0, 5.3, 2.4 and 4.7 percent for the models with 50, 75, 125 and 150 topics, respectively). For this reason, and in light of general recommendations (Blei and Lafferty, 2007; Hall *et al.*, 2008) and practice (Haans, 2019; Kaplan and Vakili, 2015) for topic modeling, we focus on the 100-topic model in our analyses.

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Appendix 2

Table AI.
Descriptive statistics and correlations

	Mean	SD	Min.	Max.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1) Topic usage in East-Asia	1.81	1.86	0.00	9.00	1.00																				
(2) Topic usage in Europe	3.80	3.14	0.00	18.0	0.26	1.00																			
(3) Topic usage in North-America	9.96	7.89	0.00	37.0	−0.02	0.10	1.00																		
(4) Topic usage in other countries	1.69	1.56	0.00	8.00	0.21	0.20	0.00	1.00																	
(5) East-Asian origin	0.09	0.29	0.00	1.00	0.35	−0.06	−0.14	0.20	1.00																
(6) European origin	0.18	0.38	0.00	1.00	0.06	0.05	−0.19	−0.11	−0.05	1.00															
(7) North-American origin	0.82	0.38	0.00	1.00	−0.08	−0.07	0.18	0.04	−0.13	−0.53	1.00														
(8) Other origin	0.09	0.29	0.00	1.00	0.07	−0.07	−0.16	−0.07	−0.10	−0.05	−0.31	1.00													
(9) Top 25 affiliated	0.45	0.50	0.00	1.00	0.18	−0.04	−0.16	0.05	−0.00	−0.16	0.42	−0.14													
(10) Percentage female authors	0.11	0.24	0.00	1.00	0.04	0.06	−0.14	0.16	0.03	−0.13	0.01	0.09													
(11) One author	2.76	0.38	1.61	3.40	0.36	0.15	−0.37	0.14	0.23	0.17	0.03	−0.01													
(12) Two authors	4.33	0.34	3.04	5.11	0.13	−0.02	−0.15	0.16	0.07	−0.07	0.05	0.06													
(13) Three authors	0.49	0.50	0.00	1.00	−0.15	0.14	0.48	0.12	−0.16	−0.19	−0.07	−0.10													
(14) Four + authors	0.33	0.47	0.00	1.00	0.00	−0.01	−0.29	−0.16	−0.14	0.23	0.05	0.00													
(15) ln(Nr. of pages)	0.13	0.34	0.00	1.00	0.10	−0.13	−0.22	0.04	0.19	−0.10	0.02	0.09													
(16) ln(Title length)	0.06	0.24	0.00	1.00	0.16	−0.10	−0.13	0.02	0.36	0.10	0.01	0.07													
(17) ln(1+ Article impact)	4.72	1.61	0.00	7.93	0.37	0.32	−0.24	0.20	0.15	0.19	−0.05	−0.05													
(18) Total usage	13.52	8.57	1.00	41.0	0.07	0.37	0.94	0.11	−0.13	−0.17	0.15	−0.16													
(19) Internationally focused	0.67	0.47	0.00	1.00	0.02	−0.05	0.13	0.17	−0.08	−0.17	0.12	−0.08													
(20) Asia-focused	0.07	0.26	0.00	1.00	0.18	−0.16	−0.11	0.03	0.05	−0.03	0.03	−0.09													
(21) Special issue	0.16	0.37	0.00	1.00	0.09	0.05	−0.15	0.16	0.15	0.15	−0.08	−0.14													
	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)												
(10) Percentage female authors	−0.08	1.00																							
(11) One author	0.39	0.18	1.00																						
(12) Two authors	0.11	0.14	0.34	1.00																					
(13) Three authors	−0.31	−0.10	−0.30	−0.09	1.00																				
(14) Four + authors	0.10	−0.00	0.13	−0.01	−0.68	1.00																			
(15) ln(Nr. of pages)	0.25	0.12	0.09	0.17	−0.37	−0.27	1.00																		
(16) ln(Title length)	0.11	0.05	0.24	−0.03	−0.24	−0.18	−0.10	1.00																	
(17) ln(1+ Article impact)	0.13	0.25	0.49	0.16	−0.29	0.21	0.02	0.16	1.00																
(18) Total usage	−0.15	−0.12	−0.30	−0.16	0.49	−0.26	−0.25	−0.18	−0.14	1.00															
(19) Internationally focused	−0.06	−0.01	0.04	−0.07	0.04	−0.01	−0.11	0.09	0.09	0.14	1.00														
(20) Asia-focused	−0.01	0.03	−0.05	−0.16	−0.03	−0.02	−0.10	0.26	0.05	−0.16	0.19	1.00													
(21) Special issue	−0.12	0.19	0.15	−0.01	0.01	−0.01	−0.09	0.12	0.34	−0.13	0.24	0.10	1.00												

Appendix 3. Robustness analyses

We ran several robustness analyses to further establish the veracity of our results. First, to assess to what extent our findings are dependent on our choice of the number of topics identified by the topic model, we ran analyses based on 75- and 125-topic models. For both models, significant patterns for East Asian and North American scholars persist, while the lack of a geographic pattern in topic usage by European scholars remains for both models. However, we find that the decreased local topic usage by scholars in the other countries disappears in both the 75- and 125-topic model, suggesting that this pattern is not very robust.

Second, when controlling for whether or not the topic founding author team is multi-regional, we find that the difference in topic usage for the "other" countries reported in Model 4 disappears entirely – possibly because many of the topic founding articles by authors from these countries tend to be co-authored with someone from a different region. All remaining effects persist when including this control variable. Note that, because this control variable is very highly correlated with the different region indicators and with team size, we opt to report models excluding the variable throughout.

Third, to assess to what extent our results may be driven by differing academic origins of authors, rather than their location at the time of publication, we estimated a model where we controlled for the region where the authors' highest degrees (typically, a PhD) were obtained. We were able to identify the academic origin for 94 author teams, reducing our sample size slightly. Of these 94 teams, 5.31 percent had at least one author who was obtained her or his degree in East Asia, 18.09 percent in Europe, 88.30 percent in North America, and 1.06 percent in the other countries. Controlling for these dummies, we find that all results are unchanged from those reported in Table II. Along similar lines, we ran models where we replaced the original region dummies based on affiliation at the time of publication with these academic origin dummies. These models confirm the regional stickiness of East Asian and North American topics, and interestingly enough also provide evidence of regional stickiness for European topics: topics that were founded by scholars who received their highest degrees in Europe tend to be used more frequently by other European scholars (4.88 times vs 3.51 times, respectively; $\chi^2[1] = 5.38$, $p = 0.020$). Similar to the results reported above, the stickiness for the other countries disappears for this analysis, though this may also be driven by the fact that only one topic was founded by a scholar with training outside the three major regions.

Fourth, to ensure that our findings are not the result of topic founding authors themselves building on their own work, we re-ran our models after excluding from the different counts those articles in *JIBS* written by the founding authors. This affected 31 topics' usage counts, yet all results persist entirely.

Fifth, we re-ran our regression models after removing topics that were founded before 1980 to ensure that our regression model is not biased by a possible tendency of the model to over-allocate topic founding status to early articles. All patterns reported above persisted for this reduced sample.

Sixth, we also re-ran our models whilst separating the UK from the remainder of Europe, given that the UK has a distinct role within the scholarly IB community, hosting amongst others the famous Reading School and natively sharing the lingua franca of *JIBS*. There are nine topic founding articles from the other European countries, eight from the UK, and one with scholars both from the UK and Europe. When we take topic usage in the remaining European countries as our outcome variable – also separating the original "European topic" dummy – we still do not find any evidence of regional stickiness of European (i.e. non-UK) topics. Interestingly, we do identify rather strong regional stickiness of UK topics when taking topic usage by UK scholars as the outcome variable: UK-based scholars, on average, use a research topics 3.00 times when this topic originates from the UK, compared to 1.02 times when it does not ($\chi^2[1] = 33.16$, $p = 0.000$). As such, while we do not observe regional stickiness in mainland Europe, such stickiness does appear to be present for the UK.

Seventh, we also checked the extent to which author mobility may be driving these identified effects. Specifically, we created an overview of each author who founded a new research topic as well as published two or more articles in our total sample (176 unique authors). We then created, for each author, a chronological overview of her or his publications and where the focal author was located at the time of publication. We then created a set of variables capturing whether or not the focal author switched from or to any of the other regions before and after the publication of the topic founding article. We then estimated our models again, controlling in each model for the two variables

corresponding to the relevant region. For example, we estimated Model 2 from Table II while also controlling for whether or not any of the authors was located in Europe in the past (but not when publishing the focal article) and whether or not any of the authors would move to Europe in the future (but was not located there at the time of publication of the focal article). By and large, inter-region mobility is rather low: three scholars moved to East Asia after publication of a topic founding article, one moved to Europe; five to North America, and one to the other countries. No topic founding authors were located in East Asia before publishing the founding piece while located in another region, five moved from Europe, two moved from North-America, and one from the other countries. We find that our reported results are unaffected, suggesting that inter-region mobility of authors across their careers is not confounding our effects.

Finally, we conducted analyses using citation patterns to assess the extent to which the topic modeling approach is distinct from a citation-based approach. Specifically, we used Google Scholar to identify all works that cite the topic founding articles, then created a selection of those articles that are in our sample of *JIBS* articles (to ensure comparability between our topic usage models and these models), and finally created a new set of variables based on where the author teams of these citing works were located. We used this information in two ways. We first re-estimated our original models while also controlling for how often scholars in each respective region cited the founding article. This check was conducted to ensure that our topic usage patterns were not capturing otherwise omitted region-specific citation patterns. We find that all reported results from Table II are unaffected by the inclusion of region-specific citations. Moreover, we find that these region-specific citation patterns do not substantively predict topic usage in the respective regions – only the number of citing articles from Europe marginally predicts topic usage by European scholars (each additional citation from Europe increases topic usage in Europe by 0.110, $p = 0.098$). As such, regional topic usage appears to be distinct from region-specific citation patterns, *per se*.

In all, these various robustness analyses strongly confirm that the patterns identified for North America, East Asia, and Europe are robust to alternative specifications of our models. By and large, they also confirm the patterns identified for the "other" countries, although evidence is often more mixed for these countries.

Appendix 4

	M1: topic usage in East Asia	M2: topic usage in Europe	M3: topic usage in North America	M4: topic usage in other countries
East Asian origin	0.582 (0.486)	0.423 (0.491)	−0.512 (0.147)***	2.758 (0.612)***
East Asian origin × Post-1992	−0.007 (0.563)	−0.795 (0.481)****	0.551 (0.241)*	−2.180 (0.619)***
European origin	0.004 (0.476)	−0.188 (0.469)	−0.119 (0.150)	0.139 (0.566)
European origin × Post-1992	−0.114 (0.555)	−0.386 (0.474)	0.153 (0.239)	−0.020 (0.636)
North American origin	−0.356 (0.385)	0.068 (0.439)	−0.044 (0.137)	0.584 (0.516)
North American origin × Post-1992	0.092 (0.579)	−0.612 (0.505)	0.149 (0.242)	−0.823 (0.574)
Post-1992	−0.166 (0.723)	0.802 (0.735)	−0.127 (0.329)	1.508 (0.760)*
Top 25 affiliated	0.126 (0.249)	−0.007 (0.155)	0.098 (0.070)	0.508 (0.244)*
Percentage female authors	−0.803 (0.425)****	−0.213 (0.242)	0.099 (0.161)	0.435 (0.284)
Two authors	0.000 (0.261)	−0.042 (0.183)	−0.107 (0.094)	−0.230 (0.238)
Three authors	0.378 (0.280)	−0.136 (0.302)	−0.072 (0.128)	0.005 (0.246)
Four+ authors	0.078 (0.327)	−0.107 (0.301)	−0.006 (0.189)	−0.292 (0.430)
ln(Nr. of pages)	0.468 (0.383)	0.656 (0.285)*	−0.005 (0.100)	−0.288 (0.290)
ln(Title length)	−0.075 (0.241)	−0.231 (0.186)	−0.000 (0.094)	0.616 (0.245)*
ln(1+ Article impact)	0.159 (0.095)****	0.127 (0.058)*	−0.008 (0.020)	0.231 (0.094)*
Total usage	0.049 (0.017)**	0.051 (0.011)***	0.053 (0.005)***	0.024 (0.017)
Special issue	−0.254 (0.311)	0.015 (0.192)	0.182 (0.113)	−0.459 (0.234)*
Internationally focused	−0.046 (0.210)	−0.395 (0.179)*	−0.104 (0.065)	0.509 (0.229)
Asia-focused	0.387 (0.278)	−0.527 (0.271)****	0.130 (0.178)	−0.383 (0.372)
Intercept	−2.517 (1.548)	−0.943 (1.096)	1.811 (0.505)***	−4.537 (1.519)**
Wald χ^2	291.17***	246.53***	1,272.60***	1,627.08***

Notes: Robust standard errors in parentheses. Topic usage excludes founding articles. No. of observations (101) is the number of unique articles that were first in *JIBS* to use one of the 93 topics shown in Table I – with some topics first being used by multiple articles in the same issue of *JIBS*. Baseline for region comparison is "other countries." *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; ****$p < 0.1$ (two-tailed)

Table AII.
Full temporal model with interactions

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