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Emerging market startups engage Silicon Valley: Cases from Central and Eastern Europe

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ABSTRACT

This article examines the challenges and opportunities of innovation-driven growth in Central and Eastern Europe. Drawing on firm-level survey research, we analyze the experiences of early stage Polish companies in Silicon Valley. We focus on the Polish Silicon Bridge, an international bridge organization that differs from conventional business incubators and accelerators by embedding emerging market startup companies in foreign innovation hubs. We situate the analysis in the context of the "Polish Paradox". While Poland ranks as one of the European Union's fastest growing economies over the past two decades, it is one of the EU's weakest performers measured by innovation. The Silicon Bridge program aims to expand Poland's innovation capacity by placing promising local startups in the world-class ecosystem of the San Francisco Bay Area. Our empirical study demonstrates that international bridge organizations generate significant benefits–knowledge acquisition, mentoring, networking with prospective investors and strategic partners–for young emerging market companies seeking to enter the global market. The article thus augments the scholarly literature on global innovation ecosystems, entrepreneurial internationalization, and emerging market startups.

Introduction

Global competition between innovation-based companies is mounting. To succeed in world markets, companies in both developed and emerging markets must continually strengthen their capacity for innovation–broadly conceived as the creation and adoption of new technologies, processes, and business models. While the United States relies primarily on the private sector to drive innovation, many European countries have launched public sector programs (funded by national governments and the European Union) to bolster the innovation-related capabilities of globally active companies.

This article analyzes the results of one such program dedicated to strengthening the global competitiveness of startup companies headquartered in Central and Eastern Europe (CEE). Launched in 2013, the Polish Silicon Bridge is a partnership between the Government of Poland and the Silicon Valley Acceleration Center aimed at hastening the entry of high-potential Polish startups in the United States and global markets.

The Polish Silicon Bridge is distinctive among programs designed to strengthen the global competitiveness of early stage emerging market companies. A number of emerging markets have created locally based incubators and accelerators to support domestic startups: e.g., Egypt (Mrkajic, 2017), Kosovo (Mulolli, Islami, & Skenderi, 2017), Nigeria (Iyortsuun, 2017), Russia (Rogova, 2014). Other emerging markets have launched programs that enlist foreign-based startups to take up residencies in local incubators/accelerators (e.g., Santiago-based Start-Up Chile).

By contrast, this article focuses on the experiences of emerging market startups embedded in a developed market economy with an established innovation ecosystem. In the case of Silicon Valley, the Polish startups featured in our study were placed in a region renowned for its concentration of talent, technology, capital, global connections, and entrepreneurial energy.

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We examine the Silicon Valley experiences of 11 Polish technology startups. Through surveys and telephonic interviews, we evaluate the impact of the Polish Silicon Bridge on the business development of participating firms. Our investigation focuses on the following questions:

- What benefits did Polish startups derive from their participation in the Silicon Valley program?
- How did the program influence the business strategies of participating companies?
- To what degree and in what ways did the Silicon Valley program strengthen the innovation capacity of Polish startups?
- To what extent did the program prepare Polish startups for entry into the United States and global markets?
- What does the Polish Silicon Bridge case suggest about the utility of international bridge organizations for accelerating global startups?

Drawing on the results of our empirical analysis, we propose a model to speed the integration of emerging market startups into global innovation ecosystems. In this way, our research provides guidance on how the best startup companies in the CEE region and other emerging markets can become citizens of world-class hubs such as Silicon Valley.

The article is organized as follows. We begin by explaining the rationale of our selection of Poland, whose national economic trajectory (strong GDP growth performance but low innovation capacity) renders the country a suitable case for a study of international bridge organizations. We review recent scholarly work on the challenges and opportunities facing emerging market companies seeking to enter global markets. We then address the specific problem of innovation-led growth in Central and Eastern Europe. We examine the role of international bridge organizations, noting the rising visibility of that organizational form in Silicon Valley. We proceed with our empirical analysis, reporting the results of our investigation of the experiences of Polish startups in Silicon Valley. We discuss the lessons of the Polish Silicon Bridge for enterprise development policies, international partnerships, and innovation building programs in the CEE region. We conclude by identifying directions for future research on emerging market startups and global innovation ecosystems.

The Polish Paradox

Poland presents an interesting paradox: Measured by GDP growth and per capita income growth, Poland has proven one of Europe's best performing economies over the past two decades. The country's standing as Europe's growth champion of the 1990s-2000s reflects: (1) a sizable domestic market, which now ranks as the EU's 6th biggest economy, (2) a highly diversified industrial sector populated by leading foreign multinationals, (3) a coastal outlet that confers a geographical advantage over the landlocked economies of the CEE region, (4) an ample human resource base, including a large population of university-degreed, English-speaking young professionals, and (5) major international technology hubs in Kraków, Warsaw, Wrocław and other cities.

Despite these assets, Poland ranks as one of Europe's weakest economies measured by innovation. Studies by the 2018 European Commission place Poland near the lesser-developed CEE countries (Bulgaria, Romania) in firm-level innovation, R&D funding, and other innovation-related metrics.

The Polish paradox (strong macroeconomic performance combined with weak innovation capabilities) has spurred government officials to expand enterprise development programs such PARP (Polska Agencja Rozwoju Przedsiębiorczości). A significant portion of Poland's current tranche (€86 billion) of EU Structural and Investment Funds is earmarked for technology research, SME development, educational/vocational training, and other innovation-promoting activities. The international organization examined in this article (the Polish Silicon Bridge) complements these national- and EU-level programs, seeking to boost the global competitiveness of Polish startup companies via placement in the world's leading innovation ecosystem.

The Polish case underscores the competitive pressures on the emerging markets of Central and Eastern Europe to accelerate the integration of local companies into global ecosystems. During the years leading up to its accession to the European Union in 2004, Poland undertook a broadly successful economic development strategy based on low labor costs and geographic proximity to the developed EU-15 economies. That strategy enabled the country to attract significant volumes of efficiency-seeking foreign direct investment and to expand exports of automotive products and other manufactured goods. Polish manufacturing companies became major subcontractors of leading multinationals from Germany and other Western countries.

But amid rising factor costs and mounting competition from emerging markets outside Europe, Poland and other CEE countries face growing pressure to migrate towards high value-added activities to spur innovation and global competitiveness. The Polish Silicon Bridge program addressed in this article illustrates this new strategy.

Emerging Markets in the Global Economy

The rapid ascent of emerging markets has spawned an extensive literature on emerging market-based firms in the world economy. This literature includes analyses of the rise of emerging market multinational corporations (Fey, Nayak, Wu, & Zhou, 2016; Guillén & García-Canal, 2012; Van Agtmael, 2007). These studies indicate that many emerging market Multinational Corporation (MNCs) have already reached international standards of excellence in operations, particularly advanced manufacturing. But emerging market companies lag behind their developed market competitors in innovation, reflecting persistent institutional and cultural barriers to the creation and adoption of new technologies and business models. As operational performance metrics have converged, innovation capacity has become a key driver of the global competitiveness of emerging market companies (Ramamurti, 2016).

Recent studies investigate how emerging market companies are striving to narrow the innovation gap. Sivalogathasan and Wu (2014) explore how the spillover of inbound foreign direct investment heightens the indigenous innovation capacity of emerging markets in South Asia. Misra, Memili, Welsh, and Fang (2014) address the role of Foreign Direct Investment (FDI) in promoting innovation at women-owned entrepreneurial firms in developing/emerging economies in Latin America, Middle East, and Sub-Saharan Africa. Wang, Sutherland, and Ning (2014) analyze the impact of international innovation networks in patent generation in emerging markets. Pitchayadol, Hoonsopon, Chandrachai, and Triukose (2018) examine the links between "familiness" (defined by family-specific culture and experience) and innovativeness in family-owned SMEs in Thailand. Ernst, Kahle, Dubiel, Prabu, and Subramanian (2015) and Winterhalter, Zeschky, Neumann, and Gassmann (2017) investigate the use of frugal innovation by local and foreign companies to tailor products and services for resource-constrained customers in fast-growing emerging markets. Subramaniam, Ernst, & Dubiel (2014) address the growing incidence of reverse innovation, whereby emerging market companies (exploiting cost advantages and technology leapfrogging opportunities) become first movers in innovative products that are then exported to advanced developed markets. Paulose and Nair (2015) and Naqshbandi and Kamel (2017) analyze the expanding role of open innovation in emerging markets, whereby emerging market firms (following the precedent of many leading Western companies) look outside their organizational boundaries for innovative ideas, processes, and technologies.

Innovation in Central and Eastern Europe

The challenge of innovation confronting emerging market firms worldwide strongly resonates in Central and Eastern Europe, now populated by post-transition economies whose factor cost advantages are dissipating. As CEE-based companies exhaust their potential for efficiency-led growth, they face a mounting imperative to strengthen their capabilities in innovation to compete in demanding global markets.

The case of the Czech Republic well illustrates the problems of innovation-led growth in Central and Eastern Europe. With its historical roots as the most developed economy in the region (dating from early industrialization in Bohemia and Moravia), its robust manufacturing industries (automotive, chemicals, armaments, glass, optics, etc.), and its recent reclassification as a high-income economy, the Czech Republic would appear to be a strong candidate as the regional innovation leader. Indeed, these attributes have prompted some commentators to characterize the country as a low-cost version of Germany.

However, in many respects the Czech Republic shares a closer affinity with the other post-transition economies in the CEE region than with advanced developed countries like Germany. Ministr and Pitner (2015) identify the factors impeding the development of the Information and Communications Technology (ICT) sector in the Czech Republic: insufficient private sector funding of research and development; fragmentation of higher education and research institutions that disperse innovation efforts; educational and research structures that stifle entrepreneurial initiatives; brain drain of talented scholars and researchers amid a globalized academic job market; low levels of academic-industrial collaboration.

Other studies indicate that Czech companies have achieved limited success expanding their global positions. Musteen, Datta, and Francis (2014) identify the liabilities confronting Czech companies seeking to globalize: origin, smallness, foreignness, newness. Zapletalová (2015) finds that Czech firms scaling out of their small domestic market tend to stay within geographical sub-regions and cultural clusters in the CEE area, illustrating limited financial resources and thin knowledge of foreign markets.

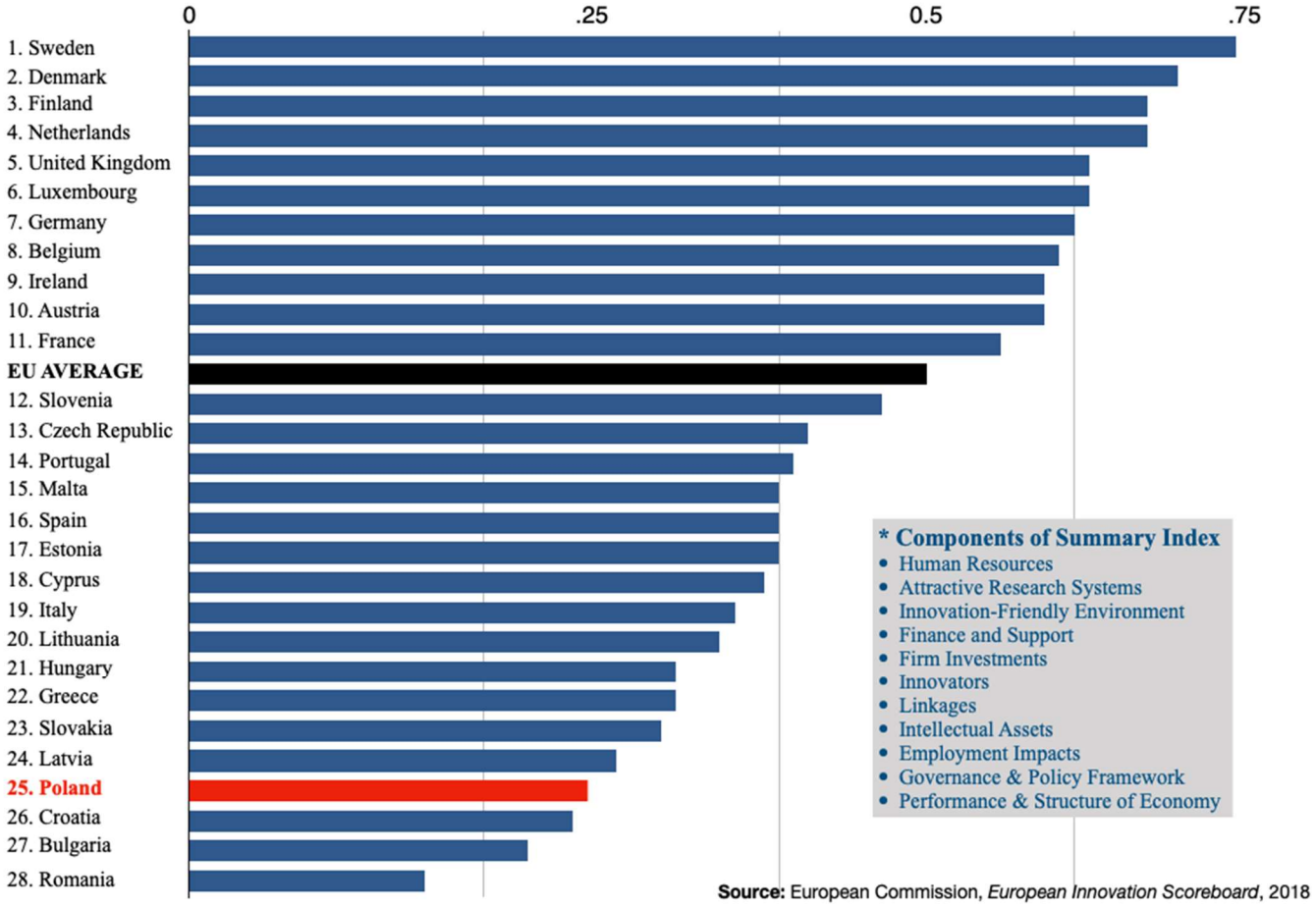
Innovation-led global growth has proven even more elusive for Poland. As shown in Table 1 below, a recent European Commission 2018 report ranks Poland 25th among the EU-28 countries in overall innovation capacity.

Table 2 summarizes the results of the Commission's examination of the drivers of innovation in the EU. Poland performs strongly in certain innovation metrics: opportunity-driven entrepreneurship; employment in fast-growing innovative sectors; enterprise births. But the country places near the bottom of the EU-28 in key measures of innovation: SMEs with product/process innovations; collaboration between innovative SMEs; private-public funding of R&D; international scientific co-publications; foreign doctoral

Table 1

Innovation in the European Union

County rankings: Summary index* (Overall performance relative to EU average, 2017).



students.

A detailed report by the World Bank (Piatkowski, 2016) cites the following factors hindering Poland's progress in innovation: deficient private financing; low public sector support; limited access to new markets; short supply of skilled R&D personnel; weak managerial skills; insufficient networking; high levels of risk aversion; psychological barriers of company managers focused on short-term results.

The report notes that Poland is particularly weak in product and process innovation, with just 8 percent of manufacturing companies introducing product/process innovations compared with 14% in the Czech Republic and 22% in Germany. In their analysis of the Polish paradox, World Bank economists consider the possibility that Poland belongs to a small group of European economies (Ireland, Spain, Slovak Republic) that can grow without extensive investments in R&D and other innovation-promoting activities. However, they conclude that Poland enjoys substantial scope for productivity gains and that improvements in the country's innovation capacity would yield a significant GDP growth premium.

To that end, the World Bank proposes an innovation framework for Poland organized around the concept of "Smart Specialization", which emphasizes the prioritization of public funding to support high-value technologies, fields, and company populations. The Smart Specialization model includes: (1) "Smart Labs" comprising selected young enterprises and experienced business/technology experts who form working groups focused on specific economic areas, and (2) "Innovation Maps" to cull critical information on company applications for R&D funding to help public agencies target projects with high innovation potential.

Our empirical study addresses the potential contributions of an alternative approach to innovation in Central and Eastern Europe: The embedding of CEE startup enterprises in established foreign-based innovation ecosystems to speed the entry of participating companies in highly competitive global markets. We focus on the experiences of Polish companies in international bridge organizations, which we treat as global business development vehicles that are related but

Table 2
Innovation in the European Union
Country rankings: Selected Sub-Indices (Rank in EU-28, 2017).

Sub-Indices	EU Leader	Poland Rank	Sub-Indices	EU Leader	Poland Rank
Human Resources	Denmark	22	Linkages	Belgium	26
Life Long Learning	Sweden	24	Collaboration between Innovative SMEs	Belgium	25
New Doctoral Graduates	Slovenia	28	Private/Public Co-Funding of R & D	Germany	27
Attractive Research Systems	Denmark	26	Intellectual Assets	Malta	17
International Scientific Co-Publications	Denmark	26	Trademark Applications	Cyprus	21
Foreign Doctoral Students	Luxembourg	27	PCT Patent Applications	Sweden	23
Innovation-Friendly Environment	Denmark	26	Employment Impacts	Ireland	15
Opportunity-Driven Entrepreneurship	Denmark	8	Employment in Fast-Growing Enterprises in Innovative Sectors	Hungary	8
Broadband Penetration	Denmark	19	Employment in Knowledge-Intensive Sectors	Luxembourg	25
Finance & Support	France	24	Sales Impacts	Ireland	22
Venture Capital	Luxembourg	22	Knowledge-Intensive Service Exports	Ireland	22
Public R & D Expenditures	Sweden	23	Sales of New Innovative Products	UK	22
Firm Investments	Finland	24	Governance & Policy Framework	Netherlands	21
Business R & D Expenditures	Sweden	23	Government Procurement of Advanced Technology	Luxembourg	18
Enterprises Providing ICT Training	Austria	24	Rule of Law	Finland	21
Innovators	Ireland	27	Performance & Structure of Economy		
SMEs with Product/Process Innovations	Belgium	26	Enterprise Births	UK	10
SMEs Innovating In-House	Ireland	27	Share of Knowledge-Intensive Industry	Luxembourg	22

distinct from conventional incubators and accelerators.

International Bridge Organizations

There is extensive literature on the role of business accelerators and business incubators in speeding the development of startup companies (e.g., Albort-Morant & Oghazi, 2016; Barrehag, Fornell, Larsson, Mårdström, Westergård, & Wrackefeldt, 2012; Bøllingtoft, 2012; Bruneel, Ratinho, Clarysee, & Groen, 2012; Cohen, 2013; Pauwels, Clarysse, Wright, & Van Hove, 2016). For globally minded startups in emerging markets, accelerators/incubators help fill the "institutional voids" of home economies with inchoate market infrastructures, weak legal/regulatory systems, and thin financial markets (Dutt, Hawn, Vidal, Chatterji, McGahan, & Mitchell, 2016).

The research presented in this article focuses on another type of business development organization that offers substantial promise for emerging market-based companies seeking to build global capabilities. International bridge organizations promote transnational partnerships between governmental institutions, non-governmental agencies, universities/research institutions, and private sector agents to spur global commerce and technology innovation. These partnerships serve both to advance the international growth strategies of locally based companies and to facilitate the

local market entry of foreign-based companies (Pietrasienski & Bitka, 2015).

For globally oriented, early stage emerging market companies, international bridge organizations represent an attractive alternative to conventional accelerators and incubators:

- Hastening the internationalization of emerging market startups via embedding in the established ecosystems of advanced industrialized countries
- Circumventing the institutional void problem of emerging markets by integrating high-potential local startups into developed market-based technology hubs
- Enlarging the financing domain of emerging market startups through links with angel investors, venture capitalists, and strategic investors in developed economies
- Boosting exports of products and services through ties with foreign customers, distributors, and channel partners
- Strengthening the global competitiveness of technology-centric emerging market companies through engagement in open innovation programs with developed market-based partners

International Bridge Organizations in Silicon Valley

The fulcrum of the international bridge phenomenon is Silicon Valley, whose standing as the leading global innovation hub renders the San Francisco Bay Area a highly attractive destination for early stage foreign technology companies pursuing international growth. The 2017 report of Startup Genome/Global Entrepreneurship Network (Startup Genome, 2017) ranks Silicon Valley first among global ecosystems, followed by New York, London, Beijing, and Boston. Silicon Valley ranks first in four components of that survey (performance, funding, market reach, and startup experience) and second to Singapore in the fifth component (talent). The economic value of ecosystems is concentrated in these "superstar" cities along with other innovation/technology hubs such as Tel Aviv, Berlin, Paris, Stockholm, Vancouver, and Sydney.

As the world's foremost enterprise ecosystem, Silicon Valley hosts nearly 18,000 active startups, whose business development efforts benefit from proximity to major multinational technology companies (Apple, Cisco, Ebay, Google, Hewlett-Packard Intel, Oracle, etc.), leading venture capital firms (Accel Partners, Kleiner Perkins Caufield, et al), and world-class research universities (Stanford, UC Berkeley). Silicon Valley captures 28% of global investments in early stage companies, generates nearly one-third of the exit value of startups globally, and hosts one-fourth of the world's unicorns (startups valued at more than $1 billion). The area boasts the world's highest share of companies founded by immigrants (46%), illustrating Silicon Valley's allure for talented foreign-born entrepreneurs and the region's high rate of success of immigrants applying for visas, long-term residencies, and United States citizenship. Silicon Valley startups employ the world's highest percentage of engineers with prior startup experience, bolstering the region's capacity to develop and commercialize advanced technologies (Gauthier, 2017).

Silicon Valley thus demonstrates the potency of global ecosystems for the following: technology driven, globally oriented startup companies: concentration of talent, both home-grown and foreign-born; access to seed funding; availability of exit vehicles; clustering of customers, suppliers, and investors; robust economic and physical infrastructure; strong governmental support; large installed multinational base; premier universities and research institutions; high global connectedness; and presence of experienced business mentors with a "pay it forward" mentality.

For European-based startups, Silicon Valley offers the locational advantages of deep economic, commercial, and political connections with Europe. While Europe ranks behind Asia-Pacific and NAFTA for Silicon Valley exports, it is the world's largest foreign investor in the San Francisco Bay Area. Led by the UK, Germany, Switzerland, and France, European firms operate more than 1,000 subsidiaries in the region. Technology represents the largest share of European FDI reaching Silicon Valley, demonstrating the area's gravitational pull for foreign companies active in ICT, life sciences, and advanced R&D. The region hosts some 170,000 European-born residents, including a sizable number of STEM (Science, Technology, Engineering, Mathematics) professionals employed at local companies. There is also extensive outbound trade and investment from the Bay Area to Europe, including substantial foreign direct investment, venture capital, and private equity investments by Silicon Valley-based firms (Berger & Brem, 2016).

Augmenting Europe's business presence in the Bay Area, the region hosts the third largest European diplomatic community in the US (following Washington and New York) supported by an array of binational business organizations, public-private partnerships, and sister city arrangements. (Randolph & Grose, 2014).

Empirical Study: Polish Startups in Silicon Valley

An earlier article reports the results of our investigation of the Czech Accelerator, an initiative of CzechInvest (part of the Ministry of Industry and Trade in Prague) that places selected Czech startups in foreign accelerators in the United States, United Kingdom, Singapore, and Israel (Mroczkow-

ski, Assudani, Muñoz-Fernández, & Khilji, 2017). Building on the Czech survey, here we report the findings of our analysis of the experiences of Polish startup companies in Silicon Valley.

Polish Silicon Bridge

The Polish Silicon Bridge is an initiative of the Polish Ministry of Economy, financed by the European Regional Development Fund under the aegis of the Innovative Economy part of the EU's National Cohesion Strategy. The program is administered by PARP in Warsaw in collaboration with the Trade and Investment Section of the Polish Embassy in Washington and the Silicon Valley Acceleration Center (SVAC) in San Francisco. Similar to the Czech Accelerator, this bridge organization provides high-potential Polish startups with training and advisory services, mentoring by experienced business leaders, networking with technology developers, and introductions to prospective investors and strategic partners. Via immersion in the global innovation hub of the San Francisco Bay Area, the program aims to speed the entry of Polish companies into the United States and international markets and to facilitate the transfer of knowledge from Silicon Valley to Poland (Pietrasienski, 2013).

Our Polish study focused on the Silicon Valley experiences of 11 out of 34 companies that were hosted by Silicon Valley Acceleration Center in 2015. Our Polish sample included Polish-based developers of mobile technologies, digital marketing, social media, Web applications, and wastewater treatment systems.

Method

Our investigation comprised computer-assisted surveys consisting of questions with Likert scales to gauge company participants' assessment of the impact of these programs, and follow-up telephonic interviews that allowed Polish managers to elaborate on their experiences in Silicon Valley. Through these surveys and interviews, we evaluated the contribution of the Polish Silicon Bridge in the following areas:

- Knowledge acquisition (markets, competition, financing, intellectual property, distribution, etc.)
- Formation of business and technology partnerships between Polish startups and host country participants
- Development of international networks to support the global expansion of Polish participants
- Securing of seed funding, venture capital, and other investments
- Realization of increased global sales

Table 3
Participants in Polish Silicon Bridge pseudonyms & activities of Polish firms embedded in Silicon Valley

Firm Pseudonym	Firm Activity
MS	Web Development
YE	Digital Marketing
ES	Mobile Technologies Web Development
AQ	Wastewater Treatment
CS	Mobile Applications for Skin Care
QL	Digital Solutions
GOG	Social Media
VAZ	Digital Technologies Management Systems
HO	Social Media
NG	Unknown
EVO	Unknown

Survey Results

To preserve the confidentiality of our survey respondents, we use pseudonyms to identify participants in the Polish Silicon Bridge, indicated in Table 3:

Knowledge Acquisition

The results of our survey of Polish startups on knowledge acquisition are reported in Table 4:

On the Likert scale (1-5, 1 = High and 5 = Low), our Polish respondents indicated a medium level of overall knowledge acquisition (2.66). Among the eight components of this survey question, the Polish startups reported the highest levels of knowledge acquisition in the following areas:

- Markets: average score of 1.82
- Financing: average score of 2.27
- Competition: average score of 2.27

Our Polish respondents indicated the lowest levels of knowledge acquisition in these areas:

- Intellectual property: average score of 3.00
- Team: average score of 3.00
- Suppliers: average score of 3.27

Distribution (2.73) and Technology (2.91) occupy intermediate positions in the knowledge acquisition survey. The

Table 4

Survey of participants in Polish Silicon Bridge knowledge acquisition

Question: On a Likert Scale of 1-5 (where 1 = tremendously and 5 = not at all), how deeply has the experience with the international bridge program changed your understanding and knowledge of successful company startup management (including such aspects as technology, markets, financing, competition)?

Area	1 = High	2	3	4	5 = Not at All
Technology	MS	VE, ES, AQ, QL	EVO, GOG	NG, VAZ, HO	CS
Markets	MS, YE, AQ, VAZ, HO	ES, QL, GOG, NG	EVO	CS	
Financing	MS, YE	QL, GOG, NG, VAZ, HO, AQ	ES, EVO		CS
Competition	MS, AQ, VAZ	YE, ES, QL, HO	EVO, GOG	CS, NG	
Intellectual Property	MS	AQ, QL, HO	EVO,VAZ	ES, GOG, NG	CS
Team	MS,AQ	QL, HO	YE, EVO, NG	ES, GOG	CS, VAZ
Suppliers	MS	AQ, QL	YE, EVO, NG	ES, GOG, HO	CS, VAZ
Distribution	MS	YE, AQ, QL, NG	ES, EVO, HO	CS, GOG, VAZ	

high rankings of knowledge acquisition related to markets, financing, and competition demonstrate the value of embedding Polish startups in the global business milieu of Silicon Valley, where managers of participating companies interact with leading multinational companies, locally based SMEs and entrepreneurs, angel investors, and venture capitalists.

The comparatively weak results of intellectual property and technology in the knowledge acquisition survey are surprising insofar as one of the presumed virtues of international bridge programs like the Polish Silicon Bridge is exposure of foreign startups to world-class technology companies and leading research universities. Our Polish sample included four startups situated in ICT (web development, digital marketing/social media, mobile technologies, digital solutions) while a fifth enterprise is a developer of a next generation wastewater treatment system. Our telephonic follow-up interviews indicated that these Polish startups gained less value from immersion in advanced technologies (where the companies were already operating on the leading edge) than from learning about the American market and United States business practices.

Impact of Experience

The next question in the survey asked respondents to gauge the business impact of their international bridge experiences. The results are shown in Table 5.

Similar to the knowledge acquisition question, our respondents registered a medium score (2.53) on the overall impact of their experience in the Polish Silicon Bridge. The Polish group reported the stronger values on the sales/productivity growth (2.00) and revenue growth (2.09) parts of the business impact survey. This result reflects the profile of the companies in the Polish sample, which was weighted towards young, growth-oriented technology companies.

Starting of new initiatives (2.64) and generation of new ideas (2.73) registered intermediate scores on the business impact survey. Securing of angel/VC funding yielded the weakest result (3.18), with a notable divergence between a Polish cohort reporting the highest score ("very descriptive") and one reporting the lowest score ("not descriptive at all"). Our telephonic follow-ups suggested that the latter companies had unrealistic expectations regarding funding opportunities for Polish startups in Silicon Valley, where seasoned local entrepreneurs compete fiercely for venture capital and angel investment.

Value of Programs

Augmenting the Likert scale numerical survey, we invited the Polish startups to respond to an open-ended question about the value of their international experience in Silicon Valley (Table 6):

Echoing these survey responses, participants in our

Table 5
Survey of participants in Polish Silicon Bridge impact of experience

Question: As a result of your experience from the Polish Silicon Bridge program, how would you rate the following statements on a Likert scale of 1-5 (where 1 = very descriptive and 5 = not at all descriptive)?

- Owing to the experience with the Polish Silicon Bridge, my firm will start New Initiatives
- Owing to the experience with the Polish Silicon Bridge, my firm will generate New Ideas
- Owing to the experience with the Polish Silicon Bridge, my firm will Secure Angel or Venture Capital Funding
- Owing to the experience with the Polish Silicon Bridge, my firm will start to see Revenue Growth
- Owing to the experience with the Polish Silicon Bridge, my firm will start Sales or Productivity Growth

Area	1 = Very Descriptive	2	3	4	5 = Not Descriptive at All
New Initiatives	GOG, VAZ, AQ	ES, NG	YE, EVO, QL, HO		MS, CS
New Ideas	AQ	YE, QL, HO	ES, EVO, CS, GOG, NG, VAZ		MS
Secured Venture Funding	CS, QL, HO, AQ		YE, VAZ		ES, EVO, GOG, NG, MS
Revenue Growth	MS, QL, HO	YE, EVO, AQ, CS, VAZ	ES, NG	GOG	
Sales/Productivity Growth	MS, QL, HO, AQ	YE, EVO, CS, GOG	ES, NG	VAZ	

Table 6
Survey of participants in Polish Silicon Bridge value of program

Question: What was the most valuable experience for you during this program?

Pseudonym	Most Valuable Experience
YE	"To meet the American way of thinking."
ES	"Meetings with local entrepreneurs."
AQ	"To meet many companies/Startups and people and sharing ideas. Huge feedback about our products."
CS	"Networking."
QL	"Contacts."
GOG	"Gaining knowledge on how startups communicate with the whole ecosystem."
NG	"Most you can learn from other entrepreneurs."
VAZ	"Gaining knowledge from mentors as well as through self-organized meetings."
HO	Understanding the USA market and obtaining knowledge about what I have to do to succeed here."
EVO	"Learning the system."
MS	"Jesper Wind" [Founder of EDGE Business Advisory, accelerator in San Francisco]

telephonic interviews emphasized the following contributions of the Polish Silicon Bridge: immersion in the global business ecosystem; generation of business contacts and referrals; cultivation of personal connections; expansion of professional networks; exchanges with United States entrepreneurs; gaining knowledge through mentors; exposure to American business culture; generation of feedback on products; cross-fertilization of ideas and approaches; and accelerating United States market entry.

Foremost Challenges

We asked our Polish respondents to describe the business challenges facing them after their return from Silicon

Valley (Table 7):

The most commonly cited challenge was generating funding and attracting investors. Elaborating on that theme, one of the Polish firms (a digital technology provider with a strong commercial portfolio and a sophisticated management team) stressed the risks of undue concentration on revenue generation to support its strategy of self-funding, which threatened to divert attention from product innovation and invited preemption of new ideas by competitors.

Planned Changes

We asked our Polish respondents to identify the particular actions they intended to take following their return from Silicon Valley (Table 8)

Our telephonic follow-ups provided additional information on how the Polish Silicon Bridge influenced the forward business plans of program participants. Respondents stressed adaptations to the United States market, drawing

Table 7

Survey of participants in Polish Silicon Bridge foremost challenges

Question: What in your opinion would be the most important challenges you could encounter upon returning to Poland in terms of implementing new knowledge gained (ideas and solutions) during the Polish Silicon Bridge program?

Pseudonym	Most Valuable Experience
CS	Concentration on team
ES	Financing
GOG	Funding of new ventures
HO	Generating sales in the USA and finding investors to scale the business
NG	Financing
QL	Ego of Polish investors
VAZ	Focusing on revenue activities instead of product, increasing the risk that someone will implement our idea faster
YE	Making our business model transparent and compelling to investors

Table 8

Survey of participants in Polish Silicon Bridge planned changes

Question: Describe the most important changes you are planning to implement inside your company resulting from your experience with the Polish Silicon Bridge program

Pseudonym	Planned Changes	Pseudonym	Planned Changes
AQ	• Future planning	MS	• Triple sales • Strengthen leadership • Marketing strategy
CS	• Go to market strategy • Prototyping • Traction results	NG	• More experiment with our product sales • Closer focus on our customer segments
ES	• Narrowing strategic focus • Hiring sales person • Content marketing	QL	• Sales strategy
GOG	• Converting existing products into startups • Changing company's offer	VAZ	• Change in communication with clients-reworking marketing strategy • Changing of approach-reach big companies first to get feedback • Focus on getting big brands through shadow IT or direct contact • Speed development cycle and focus more on rapid deployments • Considering VC funding instead of self-funding
HO	• Stronger concentration on sales • Start real sales in USA • Change the information we send to the market about our product • Change the way I express myself when speaking about what we do • Change the order of implementation of new features in our platform	VE	• Defining core value proposition • Market segmentation • Refining business model • Improving communication with customers • Marketing strategy

on their observations in Silicon Valley on how companies communicate with American customers. They also cited refinements of their approaches to global product development, noting the relative shortage of such business skills in Poland.

Recommendations to Colleagues

We asked the survey participants whether they would recommend the Polish Silicon Bridge to colleagues. The responses were highly laudatory of the program (Table 9):

Our respondents signaled strong interest in other programs administered by PARP, whose portfolio includes

Table 9
Survey of participants in Polish Silicon Bridge recommendations to colleagues

Question: Based on your experience, how would you describe the Polish Silicon Bridge program to your colleagues?

Pseudonym	Description of Program
AQ	"Big possibilities."
CS	"Great thing to start up your startup experience."
ES	"Great experience."
EVO	"Good."
GOG	"The program helps Polish companies gain knowledge about the US market."
HO	"Polish Silicon Bridge is the perfect program which will drive you from living and making business in Poland to getting into USA, making your first sales here and findings investors in USA and making your business global."
MS	"Rocket launch to the US reality."
NG	"Nice boost to think about your business."
QL	"Easy way to get into the US."
VAZ	"A great program to gain knowledge on launching a product in US, giving most advantages if your product already has traction in Poland."
YE	"World quality program."

innovation, internationalization, and SME development. The favorable reaction to the Polish Silicon Bridge also strengthened the case for the integration of international bridge programs in Poland's broader "Strategy for Responsible Development", launched in 2016 by Minister of Finance (and now Prime Minister) Mateusz Morawiecki to promote sustainable, inclusive, and knowledge-centric economic growth.

Favored United States Innovation Centers

The final question in the Polish survey prompted respondents to rate the attractiveness of particular United States cities/regions as global innovation hubs (Table 10):

The ranking of New York City and San Francisco as "most important" echoed the findings of the global surveys cited earlier in the article identifying those locales as the world's foremost business ecosystems. The high placements of Chicago (a major international business hub and host of a large Polish American community) and Boston (a leader in ICT and biomedical technology) aligned with the broader pattern of Polish companies entering the United States.

The lower placements of San Diego, Atlanta, Miami, and Seattle indicate that those cities lack high concentrations of business development resources prioritized by this particular collection of Polish startups. The intermediate United States cities on this list possess specific assets of interest to these Polish companies: Austin (a rising player in ICT), Reno/Tahoe (a region with close ties to the Polish Government and geographic proximity to the San Francisco Bay Area), and Washington, D.C. (an area that combines federal/regulatory/diplomatic organizations and significant ICT and biomedical clusters).

Discussion

This article augments the extant literature on emerging market startups by examining the contributions of international bridge organizations (a distinctive type of business development agency) to the growth strategies of early stage companies in Central and Eastern Europe.

The Polish cases analyzed in the article (along with our previous work on the Czech Accelerator) strengthen the the-

Table 10
Survey of participants in Polish Silicon Bridge favored US innovation centers

Question: On a Likert scale of 1-5 (where 1 = most important and 5 = not important) please indicate which US innovation centers you would consider most important for future international bridge programs.

Pseudonym	1 = Most Important	2	3	4	5 = Not Important
AQ	Austin, Chicago, San Francisco, Washington	Atlanta, Boston, Reno/Tahoe, San Diego, Seattle	Miami		
ES	New York, San Francisco	Boston	Austin, Chicago, Seattle, Washington	San Diego	Atlanta, Miami, Reno/Tahoe
EVO	Atlanta, San Francisco	Reno/Tahoe, San Diego			Austin, Boston, Chicago, Miami, Seattle, Washington
GOG	New York, San Francisco	Chicago, Miami	Atlanta, Austin, Boston, Reno/Tahoe, San Diego, Seattle, Washington		
HO	Chicago, New York, San Francisco	Reno/Tahoe	Boston, Miami, Washington	Seattle	Atlanta, Austin, San Diego
MS	Austin, Boston, New York, Reno/Tahoe				
NG	Chicago, New York, San Francisco		Boston, San Diego, Washington	Atlanta, Miami	Austin, Seattle
QL	Boston, New York, San Francisco	Austin, Chicago, Washington	Miami, San Diego, Seattle	Reno/Tahoe	Atlanta
VAZ	New York, San Francisco	Austin, Chicago			Atlanta, Boston, Miami, Reno/Tahoe, San Diego, Washington, Seattle

oretical framework for scholarly research on emerging market startups and global innovation ecosystems. Our study of the Silicon Valley experiences of CEE-based startups provides the foundation for a distinctive model of the international bridging process, indicating particular concepts and sequences to explain the relative effectiveness of alternative strategies of new enterprise development.

Efficacy of Incubators and Accelerators

Business incubators, business accelerators, and hybrid incubators/accelerators have proliferated over the past decade. By 2018, over 3,000 such organizations were active worldwide covering both developed markets and emerging markets.

However, empirical research indicates that these organizations have generated little measurable impact on the business outcomes of startup companies. Only a handful of elite global accelerators (e.g., Silicon Valley-based Y Combinators and Boulder, Colorado-based TechStars) have produced statistically significant effects on the acceleration trajectories of portfolio companies (Hallen, Bingham, & Cohen, 2014; Van Weele, van Rijnsoever, & Nauta, 2017; Yin & Luo, 2018). Drawing on a large study of startup firms in Italy, Lukeš, Longo, and Zouhar (2018) find that incubators may actually have a negative effect on the sales revenue of incubatees. In these cases, the "safe harbors" of business incubators pamper resident startups, shielding them from market competition and leaving them unprepared upon graduation.

Conventional incubators/accelerators deliver a number of intangible benefits that are not fully captured by financial performance metrics (e.g., expansion of international networks; cross-fertilization of ideas and experiences; exposure to leading innovative technologies and business models). But the middling results of the global proliferation of accelerators/incubators underscore the need for alternative business development models better suited to the needs of startup companies with global growth aspirations.

Promise of the International Bridge Model

The international bridge organizations addressed in this article complement conventional incubators/accelerators. The particular design of the Polish Silicon Bridge (immersion of CEE technology startups in a world-class

foreign ecosystem) affords participating companies greater opportunities for rapid globalization than locally based incubators/accelerators. By forging transnational partnerships between private and public actors, international bridges provide financial support to promising startup firms that may be unable to raise seed funding through traditional investor channels. International bridge organizations also serve as a transitional vehicle for high-potential startups that are not ready for entry into premier accelerators. The application of exacting selection criteria, rigorous residential programs, and systematic follow-up with graduating firms (discussed below) would elude the safe harbor problem that afflicts many incubators/accelerators and heighten the effectiveness of international bridges.

Conclusions

For emerging market companies, international bridge organizations offer a different value proposition than conventional business incubators and business accelerators. Through immersion in developed market-based ecosystems like Silicon Valley, bridge organizations afford emerging market-based startups direct exposure to world-class technology companies, seasoned entrepreneurs, angel investors, and venture capitalists that hasten integration of those firms into global markets.

The international bridge organizations also circumvent the institutional void problem of emerging markets, whose structural liabilities (thin capital markets, shortage of experienced mentors, weak industry-university links, low public sector capacity) hinder the growth strategies of high-potential startup firms. Embedding in dynamic, globally connected, risk-tolerant milieus like Silicon Valley and New York also helps such companies surmount local cultural barriers to international business development.

The international bridge organization assessed in this article (the Polish Silicon Bridge) is especially promising to startup companies in Central and Eastern Europe, which by virtue of region-specific assets are uniquely well positioned for integration into global ecosystems. Eastward enlargement aligned the former socialist countries with the financial/legal/regulatory norms of the European Union, rendering the new accession states of the CEE region comparatively safe locations for technology-intensive, IP-sensitive foreign direct investment. EU enlargement also stimulated high volumes of manufacturing-related FDI, creating a large installed base of leading Western multinationals and integrating CEE companies into regional/global value chains. Furthermore, EU accession gave the CEE countries access to the European Union's Structural and Investment Funds, whose early tranches hastened modernization of regional infrastructure and whose current tranche prioritizes technology, innovation, and human resource development. These regional assets clearly benefit CEE-based, technology-driven startup companies that aspire to quick expansion in global markets.

The CEE region further benefits from an impressive endowment of university-degreed, English-speaking young professionals, a number of whom gained valuable experience with American and West European multinationals before launching their own enterprises. This factor heightens the probability of success of CEE-based entrepreneurs in developed market ecosystems like Silicon Valley, facilitating participants' adoption of innovative technologies and business models and easing their cultural integration into foreign business communities.

Our investigation of the international bridge experiences of Polish startups illuminates the particular challenges and opportunities facing early stage CEE companies. The startups that participated in the Polish Silicon Bridge are representative of a new generation of CEE companies, and include technology based, globally oriented young enterprises poised to leverage their international experiences for innovation-driven growth. Our research indicates that Polish companies reaped substantial benefits from their experiences in Silicon Valley and other foreign ecosystems, notably expansion of transnational networks critical for United States and global market entry.

But our study also demonstrates the limitations of the international bridge model. While immersion in intensive, fixed-term programs like the Polish Silicon Bridge can deliver short-term benefits to participating companies, their long-term success depends on sustained implementation of lessons learned during the foreign ecosystem experiences. To that end, Polish authorities should consider refinements of their international bridge models, including:

- More aggressive promotion of international bridge programs with local companies to enlarge the size and improve the quality of the applicant pool
- More rigorous selection criteria to enlist local startups exhibiting the most talented management, most promising technologies, and greatest prospects for success in the international bridge
- Systematic tracking of the business progress of graduating companies (e.g., angel/venture capital received; foreign strategic partnerships formed; revenue growth achieved; new technologies/business models/practices adopted; new products and services commercialized)
- Reconnecting participating companies and their foreign hosts to strengthen the personal/professional connections forged in the international bridge, through funded return

trips by local participants to the foreign host and/or visits by foreign partners to the home country
- Sponsorship of international exhibitions to showcase the achievements of local participants in the bridge programs

As an advanced post-transition country that has largely exhausted its scope for efficiency-led growth, Poland faces increasing pressure to pursue innovation-led economic development strategies. The rapid integration of promising local startups in global innovation ecosystems is a key component of that strategy. However, realization of such a goal hinges on the creation of a critical mass of startup companies, small and medium enterprises, and emerging multinationals capable of integration into global innovation ecosystems. The pilot international bridge program examined in this article constitutes a first step towards that objective.

Future Research

The findings reported in this article draw on a small sample of recent participants in the Polish Silicon Bridge, indicating directions for future research on the integration of emerging market startups in global innovation ecosystems.

A future research agenda may include the following:

- Longitudinal analyses to track the progression of individual emerging market companies from launch to commercialization to global entry
- Firm-specific case studies to observe emerging market startups engaged in business incubators, business accelerators, and international bridge organizations
- Comparative studies of startups, incubators, accelerators, and bridge organizations in different emerging and developed market countries
- Mapping of global innovation ecosystems to trace the transnational commercial activities of emerging market-based and developed market companies in those hubs

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