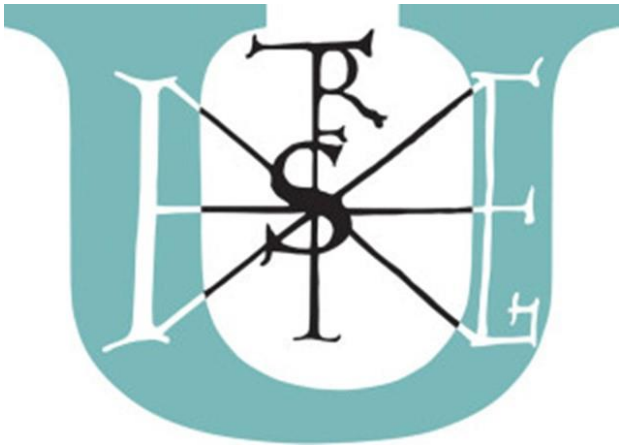

Szent István University

Doctoral School of Management and Business Administration

The Learning Economy, Innovation, and ICT-generated productivity: International comparison between the European Union and North America

The Thesis of the Ph.D. Dissertation

Brian Mitchell, MPM

Gödöllő, Hungary

2020

The PhD School

Name: Szent István University, Gödöllő, Hungary
Ph. D. School of Management and Business Administration Sciences
Discipline: Management and Business Administration

Head: Prof. Zoltán Lakner, Director of the PhD School
Professor
Szent István University, Gödöllő, Hungary

Supervisors: Csaba Makó, DSc.
Professor
Szent István University, Gödöllő, Hungary

Tamas-Michel Koplyay, Ph.D.
Professor
Université du Québec en Outaouais

Table of Contents

Abstract

There is much academic literature concerning Innovation, Organizational Work Forms, and Productivity, but apparently very little combining all three measures into one body of comparative research examining the European Union, the United States of America, and Canada. As the EU moves toward a potential post-Brexit reality and the United States is seemingly moving toward a more isolationist stance (e.g. leaving the Paris environment agreement), the need to increase productivity and innovation are now of prime importance to all governments, and especially to the EU where productivity has stagnated behind the United States, despite the recent modest improvement. Innovation, on the other hand and using the mainstream innovation indices, has maintained a healthy competition with some European countries routinely placing ahead of the United States in various indices.

This research first reviews the literature on Organizational Learning and Forms of Work Organization to establish the basis of the different types of indicators that will be utilized later in the Principal Components Analysis and also the Hierarchical Cluster Analysis. The term "Knowledge Economy" is attributed to Peter Drucker (Drucker, 1969;264) and has been used to reflect this increased importance of knowledge. A knowledge economy is one where organizations and people acquire, create, disseminate, and use knowledge more effectively for greater economic and social development. Knowledge, in the context of business and commerce, is a remarkably difficult subject to have one dominant theory encompassing the acquisition and retention of knowledge in a commercial setting, ultimately leading to innovation, that covers all the different types of organizational designs and management approaches. Lundvall (2009;226) argues that the "Knowledge Economy" as Drucker coined it (Drucker,1969;263) is actually a "Learning Economy" because the new technology has to be learned, used, understood, and finally exploited for innovation. In all, five Forms of Work Organization will be examined: Discretionary Learning, Constrained Learning, Independent Learning, Taylorist, and Simple/Traditional learning approaches. Data from the Programme for the International Assessment of Adult Competencies (PIAAC) first cycle are used to quantify the types of learning that each of the twenty-two sample countries exhibit.

A brief history of recent productivity results will allow the reader to become familiar with the economic history of the sample countries, although most of the productivity review deals with the European Union as a single entity, the Author uses Conference Board (2018) adjusted productivity data to break out the European Union into regional groupings that have been prevalent in the Forms of Work Organization literature previously. Additional review of the academic literature on the impact of Information and Communication Technologies (ICT) to business and then national and supra-national productivity results is explored. Although Artificial Intelligence and Automation are not a direct subject of this research, the potential impact AI may have jobs and types of jobs cannot be ignored. A brief section will conduct a high-level review of AI and Automation, and also address potentially how different jobs may be impacted, but the present research can be seen as a step to being able to better quantify potential employment impacts in future research.

Innovation means many things to many people. For this research, the definitions from the Oslo Manual, 4th Edition (OECD,2018) are used to frame what innovations are to give a strict framework for later choosing indicators that will be utilized in the analyzes in this exploratory research. The author briefly discusses how Canada, the United States, and the European Union

provide government support for innovation within their borders. How national innovation is also measured through the various innovation indices are reviewed at a high level to give the reader an understanding of the various current approaches to quantifying "innovativeness".

Chapter 5 contains the first of the analyzes, the Principal Components Analysis. As stated earlier, there is very little research combing the Forms of Work Organization and Innovation for Canada, the United States, and the European Union. The chapter starts with the descriptions of the indicators used for consideration in the two analyzes completed by the author. The methodology, following the methodology example of the European Digital City Index Report (Bannerjee et al,2013), the data was prepared to complete the Principal Components Analysis (PCA). Whilst PCA do not indicate causality, for this type of exploratory research it allows an indication of which characteristics are correlated to the data set and which are not. There were two levels of unexpected findings, one on the individually highly correlated indicator, and the number of relatively equally highly correlated indicators. The "Regulatory Quality" of the individual country is the highest correlated indicator which was not expected by the author. The other unexpected finding was that there were many highly correlated indicators, which suggests that there is no one single "magic bullet" that countries could use to quickly increase their innovation status.

Whether countries that are innovative share more like characteristics with other innovative countries versus less innovative countries, and what those characteristics are examined Chapter 6. Through a Hierarchical Cluster Analysis, groupings and sub-groupings were established that found, indeed, high innovation countries share more characteristics with other high innovation countries, and the same is true for countries that have lower innovation levels. There were stark differences using the same data as the Principal Components Analysis in this chapter as the research established results with similarities to the existing innovation indices.

The Chapter 7 elucidates the results of the analyzes in the preceding chapters together and discusses the findings of both analyzes and establishes the working themes to understand the results. Two of the three hypotheses are proven, with thoughts about why the non-proven hypothesis occurred. Innovative countries share more characteristics with each other than they do with less innovative countries. ICT use does also positively impact innovation within nations. Productivity, as the academy has borne out, is often used as the proxy for innovation, yet, the countries that appear to exhibit less innovation have had the highest growth rates in the recent past. One reason may be the use of these countries as "factor economies" to outsource various business requirements or manufactured goods, but the economic forces that Gordon (2018) cites in the most developed countries may also not have as great an impact on the economies of the Central and Eastern European countries at this time. Whether the result of he "great catching up" will also result in the CEE countries also experiencing the same fate is yet to be seen.

The final chapter summarizes the research of the author, lists the key findings of the research, and suggests avenues of potential future research connected to subject. The kay findings are that Forms of Work Organization do have an impact on innovation, Regulatory Quality is import to innovation, but there are many almost equally impactful characteristics that have to be considered when examining overall conditions for innovation. Future research will benefit from the completion of the Programme for the International Assessment of Adult Competencies (PIAAC) that will be able to identify the Forms of Work Organization in more

countries in the European Union, allowing a larger study to be conducted that will assist the academy in reaching a better understanding of the nuances of supporting innovation. There are also governmental policy implications that the author suggests that nations could undertake to support innovation in their domestic economies that are a result of this research.

Research Proposition and Questions

This researcher was not able to find a body of systematic research that addresses the three research questions containing the EU, Canada, and the United States in the academy. In short, the following questions will be investigated and answered in my research:

1. What are the differences and similarities between the various countries which influence innovation?
2. What are the differences between the various-s countries that influence productivity?
3. And finally, how does ICT use affect all aspects?

Once these questions are answered, the interaction between can be investigated to determine the real drivers of the results.

Research Scope, Objectives, and Design

This research will be an examination of forms of work organizational, productivity, and innovation; and especially the effect of Information and Communication Technologies (ICT) adoption and use on each component. The literature and data will be gleaned from academic papers from journals, research from various governmental and non-governmental sources including, but not limited to; the Organization for Economic Co-operation and Development (OECD), Eurostat and the various Eurostat supported projects and programs, The World Bank, The United Nations (UN), and various other non-government-funded bodies such as the Conference Board. The research methodology will contain two separate approaches:

1. Review of academic literature that has investigated any aspect of the three aspects of the investigation;
2. Review of applicable governmental or quasi-governmental (i.e.: World Bank and OECD) datasets to have somewhat comparable results. Obtain and review data concerning Innovation, Employment Types, and Productivity from various data bases and reports from the governmental and non-profit bodies and research organizations. During this review, definition of the main investigation points will be determined and those results or indicators will be examined in view of the other three.
3. Complete a Principal Components Analysis to determine which of the indicators have correlation to the dataset.
4. Complete a Cluster Analysis using the same variables to determine the characteristics of the sample countries in relation to the principal Components Analysis.

Productivity

The productivity gap between North America and the European Union has been examined in many ways by many different researchers in the course of the last two decades with far more experience and expertise than this author. This chapter examined productivity in the broad sense, and also what impacts Information and Communication technologies have had upon productivity. Perhaps the most interesting finding is that the perceived falling behind of Europe

versus the United States that permeated literature during the 2000s may not quite be correct. The 2018 Conference Board adjusted productivity data shows that, when the entire European Union is taken into account, Europe was not "left behind at the station" as Gordon (2004;1) and conventional economic thought had dictated. Timmer et al.'s research (2011) used Conference Board data from 1950 to 2009 for the United States and the EU-15 to reach their conclusions. There are a couple of caveats in this review of Timmer et al.'s work that are very important to consider when examining their results and the revised 2018 Conference Board data. One is that Timmer et al. (2011) used the best available data at thar time. In addition, their review using only the EU-15 may have been warranted as the Central and Eastern European New Member States had experienced what can be considered to be a massive transition from planned economies to free market economies, and Timmer et al. (2011) may have wanted to use "like for like" results for advanced economies. When the EU-13 countries are included in the analysis, the EU outperformed the United States in two of the three indicators originally used by Timmer et al. (2011). Canada had significantly lower results than the EU and United States in GDP per hour worked and GDP per capita growth, yet had a higher result for annual GDP percentage growth in the 1995 – 2007 time period examined, please refer to Table 3.2.1. Certainly, finding that Europe did not trail behind the United States in productivity and subsequent critique is not intended to be an indictment on the approach the authors took, but rather in light of a new interpretation of the data, it is an updating of the results. It is worthy to note that Timmer et al.'s 2011 did set the tone for economic thought in the academy [see Gordon,2004 and van Ark, Inklaar, and McGuckin (2003b), both described in this chapter as examples].

The final portion of this chapter was a review of Artificial Intelligence and Automation presently in the academy. This subject is not directly a part of the research of this dissertation, but it is innately part of the larger discussion around the future of employment, jobs, and forms of work organization such that it cannot be ignored. It appears that there is a wide gulf between the academy concerning what will happen to employment and jobs in the future. McKinsey and Company predict that the most impact on employment will occur in jobs that are routine physical, collecting data, and processing data (McKinsey and Company,2017;6). While the types of tasks identified by the McKinsey report seem to be fairly straight-forward, Brynjolfsson and Mitchell (2017;1531) suggest that even where there are jobs that are partially automated, there will remain complementary job tasks or total jobs that will remain in the realm of human-only performance.

Innovation

Innovation is an easy concept to understand. From the OECD's Oslo Manual 4th Edition (OECD,2018;20-21, an innovation is something new, and that "something" can be almost anything connected to the firm's processes or products. And if the entire national or supra-national economy is innovative, conventional theory would conclude those economies would be globally competitive. The previous edition of the Oslo Manual (Third Edition, OECD/Eurostat, 2005) quantified four types of innovation: product, process, organizational, and marketing. To note, the most recent Oslo Manual (OECD,2018;20) consolidated the previous manual's approaches to categorizing Innovation into two broad categories:

- Innovation of products or services offered.
- Business process innovation.

Consolidation of Research Findings and Results

Are innovative countries alike? What are the similarities and the differences? Does one Form of Work Organization lend itself better to innovation, and if so, is this shared with all countries that are more innovative than others? The preceding two chapters have examined the principal components of the dataset selected and the identified forms of work organization taken from the PIAAC (Greenan et al., 2017) and indicators that align with the Oslo Manual for Innovation (OECD, 2018). How all the inputs connect is nuanced and at times complex. Causality cannot be precisely determined from a principal components analysis, but from it, a glimpse into what has to be present for a country to be innovative potentially. That no single indicator was above the 0.850 level, but six of the indicators were above the 0.800 level, and two more were above the 0.700 level should signal to the reader that there has to be multiple contributors to support innovation at a country level, and it should also signal that there is no single "magic solution" that will induce a country to be suddenly innovative where it was not previously.

Principal Component 1 (PC1)		Principal Component 2 (PC2)	
Correlation	Indicator	Correlation	Indicator
0.848	Regulatory Quality	0.857	Independent Forms of Work Organization
0.836	Employment in Knowledge-Intensive Services	0.430	Expenditure on Education
0.843	Researchers	0.402	Simple Form of Work Organization
0.826	Patents	-0.849	Constrained Forms of Work Organization
0.816	ICT Use	-0.531	Taylorist Forms of Work Organization
0.801	Discretionary Learning		
0.775	General Expenditure on R&D by Business		
0.709	Expenditure on Education		
0.539	Total Computer Software Spending		
0.535	Staff Training		
-0.653	Simple Forms of Work Organization		
-0.477	Taylorist Forms of Work Organization		

Table 7.2.1 – Principal Component 1 and 2, Significant Correlations
Source: Author's calculations using SPSS Version 26

With also conducting a Hierarchical Cluster Analysis, the Principal Components can be reviewed in connection with which countries are similar to each other, as judged by SPSS Version 26.

Country Groupings produced by Cluster Analysis					
Group 1			**Group 2**		
Sub-group 1 (Strong Innovators)	Sub-group 2 (Strong Innovators)	Sub-group 3 (Innovation Leaders)	Sub-group 4 (Moderate Innovators)	Sub-group 5 (Moderate Innovators)	Sub-group 6 (Moderate Innovators)
Netherlands (Innovation Leader – EIS)	Austria	Denmark	Poland	Italy	Slovenia
United Kingdom	Belgium	Sweden	Slovakia	Spain	
Canada	France	Finland	Lithuania	Greece	
Ireland			Czech Republic	Cyprus	
Germany			Estonia (Strong Innovator – EIS)		
United States					

Table 7.2.2 – Hierarchical Cluster Analysis Groupings
Source: Author's calculations using SPSS Version 26

Hypotheses Results

H1: Innovative countries share more characteristics with each other than with less innovative countries.

Idea: *The hypothesis is that innovative countries share traits that make them innovative; whether it is education, government support, or social characteristics, common threads will enable countries to be innovative.*

H1 has been proven. The Hierarchical Cluster Analysis and subsequent review and comparisons of the grouped countries in the dataset showed that the most innovative countries were grouped together based upon their characteristics and that countries generally were grouped with those others that shared like characteristics. The results generally followed the European Innovation Survey (EIS,2019) and other Innovation indices results for relative rankings in an "order of magnitude" manner, but not exactly. For the most part, these results also reflected the traditional economic or geographic groupings that have been applied in various academic and governmental research. The novelty in this research was the addition of Forms of Work Organization with the Innovation indicators. Combining the two reinforced the results and groupings in many ways, such as the similarities of the Nordic countries to each other and the Southern countries to each other.

H2: Productivity and Innovation are connected, but are not proportional.

Idea: *Although Innovation and Productivity are inter-connected, the same levels of each in different countries may not achieve the same results.*

H2 has not been proven. The discussion concerning the GDP per Person Employed in section 7.2.6. and relative levels of innovation is a difficult question that this research has not come to a definitive answer. The high productivity rankings, as proxied by GDP per Person Employed Percentage Change, shows the Eastern European Countries in Sub-group 4 having the highest rankings in the sample, yet the other indicators show relatively lower scores and due to that, put Sub-group 4 and 6 countries into the lower country grouping for level of innovation. Part of this may be due to the "snap-shot" characteristic of this study not being able to adequately compare results as the act of economic convergence or lags between implementation and benefits is still underway for the New Member States. An alternate reason may also be that whatever issue or related issues that have caused the productivity slowdown in the economies has not affected the CEE countries as yet. For this reason, this hypothesis cannot be completely proven through this research.

H3: ICT use supports organizational or process innovation, but outside influences may limit the actual increases to productivity.

Idea: *Information and Communication Technologies have allowed productivity to increase, but some countries can harness the innovation better.*

H3 has been proven. This hypothesis can be proven through the results of the as proxied by GDP per Person Employed Percentage Change versus the relative level of innovation as determined through the Principal Component Analysis and the Hierarchical Cluster Analysis which grouped countries into "like" groupings based upon their characteristics. The countries with higher rankings exhibited lower levels of productivity growth versus the less innovative countries. This is where the literature from Gordon (2018) proves to be very important to consider, but perhaps not the entire story, as to why highly innovative countries are experiencing low growth. All things held equally, ICT and the spin-off effects of complementaries such as training and organizational design innovations, should result in productivity growth. Issues such as market and economic factors such as trade agreements or sanctions, general economic climate, and interest rates may have more of an impact than the potential performance of national economies.

Conclusion

Multi-disciplinary research can be challenging. It can also be rewarding, perplexing, confusing, but if one is fortunate, it can also be enlightening. This author leaves it to the reader to decide which outcome is most fitting for their own mind. This research had two novel approaches:

1. The inclusion of Forms of Work Organization when examining Innovation.
2. The inclusion of the United States and Canada when examining Forms of Work Organization.

While there have been some researchers such as Bloom et al. (2012) who have examined management practices across the globe, they only examined Manufacturing, Schools, and

Hospitals. This researcher was unable to find any research that connected the Forms of Work Organization that included Canada and the United States with the European Union, nor also including Forms of Work Organization in relation to Innovation.

Summary of the Research

Innovative countries do share more characteristics with each other than they share with less innovative countries. The traditional geographic groupings also appear to hold generally for this research, and although there are positive signs that the Central and Eastern European economies are catching up to the Continental, Northwestern, and Nordic countries, there is room for improvement as yet. The Southern European countries are still at a deep disadvantage compared to the rest of the European Union and North America.

Within the innovation indicators selected for inclusion in this exploratory research following the Oslo Manual, there was not one that stood out as being the "magic wand" to be able to grant any country instant increases in innovation through both scientific analyzes. With six clustered indicators highly correlated to Principal Component 1 (PC1) and all within 0.047 of each other, including the Discretionary Learning form of work organization, this researcher posits that the collection of adequate levels of all of these together is very important for a country to be innovative. The six highly correlated indicators were: Regulatory Quality, Employment in Knowledge-Intensive Business Services, Researchers, Patents, ICT Use, and Discretionary Learning. Expenditure by Business in R&D, general national Spending on Education, Computer Software Spending, and Staff were also moderate correlations, which would support the notion that innovation is complex and depends upon the right recipe to deliver dividends.

The addition of the Forms of Work Organization and the resultant findings that economies "work" more innovatively when workers are provided with higher levels of control over their time, their methods, and decision-making authority. Discretionary Learning was highly correlated to Principal Component 1 and the Independent form of work organization was the highest correlation to Principal Component 2. Taken together, they share many characteristics and show that having independence in planning one's own time, ability to solve complex problems, collaboration, sharing work information, and persuading or influencing people are valuable job characteristics to develop and support to enhance innovation.

Key Findings

Innovation is complex, and no single determinant will individually allow non-innovative countries to become innovative in a short period of time. This research should assist both Governments and Industry in examining where policy changes, changes to the national educational systems, and financial or tax-credit support for Innovation should be placed, and perhaps even be able to create a roadmap for allowing countries to become much more innovative in the future. While the antecedents of innovation appear to be understood to be many and complicated (Brynjolfsson and Hitt,1998:11, Brynjolfsson and Hitt,2002;175-176). There are many important characteristics that countries have to have for Innovation to be able to be realized.

- That Regulatory Quality was the highest correlation in PC1 was a surprise to the author, yet this supports the recent findings of Grela et al (2017;87) that countries with good business and credit regulations tend to grow faster, perhaps the same type of conditions

allows countries to innovate better or faster. Once considered critically, living and working in a safe environment with a high quality of regulatory sophistication where the basic human and societal needs are satisfied shows great potential for those citizens to be able to focus on issues that are on a higher plane of thought than day-to-day survival requirements. In many developing countries that are active global supply chain participants, these "safe" conditions may not exist.

- Forms of Work Organization really do matter when it comes to Innovation. This exploratory research showed that two Forms of Work Organization are correlated to countries that are considered to be innovative; Discretionary Learning and Independent. Discretionary Learning was one of five indicators that had a correlation above the 0.800 level in the first Principal Component, and Independent was the highest correlation of Principal Component 2 at an 0.857 level.
- This research showed that high levels of Regulatory Quality, Researchers, Employment in Knowledge-Intensive Business Services, Patents, ICT Use, and investment in Research and Development by Business all need to be present for a country to be innovative.
- Training and Total Computer Software Spending are less important than the clustered six indicators, but both still need to be present in a sufficient manner to support innovation.
- Productivity is generally proxied through measures of Gross Domestic Product growth; it may be that the measures need to be examined in relation to innovation due to the negative correlation to all the Principal Components in this research because of the stagnation of Productivity in the advanced economies.
- This research showed that the generally accepted academic view of Europe being "left behind" by the United States in productivity should be revised in view of the Conference Board's 2018 adjustment to the productivity statistics and by incorporating the entire EU-28 results into the assessment.

Future Research

I have greatly enjoyed this research. It is multi-disciplinary touching forms of work organization, productivity, and innovation. While I examined many different subjects and streams of literature, there were research directions that I could not undertake. Avenues for future research on this subject are:

- Further research should focus on the links between productivity and innovation to find the causes of the lingering low productivity of mature nations in the face of accelerating technological innovation. The situation, to this author, is counter-intuitive as we are at the boundaries of technology presently, but seemingly cannot make even small leaps in productivity.
- Building partnerships with other trading nations, specifically those innovative countries in Asia that are, or could potentially become, significant trading partners for nations in the European Union. This approach could also be used to identify those nations that offer complimentary economic or commercial situations that do not exist in ones own

country, thus creating opportunities for co-operation or symbiotic trade/investment that may benefit both nations.

- Extend the research to include a detailed inclusion of Artificial Intelligence (AI) development indicators to provide preliminary research on how the existing innovation indicators are impacting the ability of individual countries to develop AI technologies. This future research would be in the same vein as this present research: exploratory.
- A more detailed examination of the European Union and other OECD countries in relation to Forms of Work Organization and Innovation will be able to be conducted once the Programme for International Assessment on Adult Competencies (PIAAC) third round of the first cycle and the second cycle are complete in the early 2020s. Having a yearly, or at least time-phased panel data from the PIAAC would be able to create a way to understand which indicators, over time, are the most impactful.
- Act as a direction for the EU countries to be able to support the development of conditions to increase innovation within their countries, and specifically, the Central and Eastern European countries that are still engaged in the "Catch-up" phase with the other EU countries. The Southern Countries Greece, Italy, and Portugal should also consider in which of the indicators they need to support to draw themselves from their current economic situation.
- Act as a blueprint for future social and societal development for those EU Candidate nations (North Macedonia, Montenegro, Serbia, and Albania).
- Introducing the economic and industrial sector profiles for each country may also be able to create a better understanding of why certain forms of work organization are more prevalent in some economies compared to others, and how they interact at a national and supra-national level.

PUBLICATIONS

FULL PAPERS PUBLISHED IN INTERNATIONAL SCIENTIFIC JOURNALS:

1. Koplyay,T., Chillingworth, L., **Mitchell, B**., Corporate Lifecycles: Modelling the Dynamics of Innovation and Its Support Infrastructure), Technology Innovation Management Review (TIM), Vol,. 3, Issue 10, special issue on Managing Innovation for Tangible Performance, 2013. ISSN: 1927-0321. https://timreview.ca/article/733
2. Mako, C., **Mitchell, B.**, Knowledge Economy and Innovation: A European Comparative Perspective, Journal of Self-Governance and Management Economics, Vol. 1, Issue 2, 2013. ISSN 2329-4175 • e-ISSN 2377-0996.
3. Mako, C., Illesy, M., **Mitchell, B.**, Systematic Country Differences in the European Innovation Performance (Does Institutional Context Matter?), Hungarian Management Science Journal, special English edition, Fall 2014, ISSN 0133-0179
4. Mako, C., Illesy, M., **Mitchell, B.**, Developing Dynamic Innovative Capabilities: The Growing Role of Innovation and Learning in the Development of Organizations and Skills in Developed and Emerging Nations of Europe, Journal of Entrepreneurship and Innovation in Emerging Economies (SAGE Publications), Vol. 1, No. 1, pages 18-38, January 2015, ISSN:2393-9575,Online ISSN: 2394-9945

5. Koplyay, T., **Mitchell, B.**, Cohn, S., Fekete, M., and Jazouli, A., Risk Profiles Along the Lifecycle in Dynamic Markets, Management and Production Engineering Review, Vol. 6, No. 3, pages 35-46, September 2015, ISSN (Online) 2082-1344, DOI: https://doi.org/10.1515/mper-2015-0024
6. Koplyay, T., Jazouli, A., Lloyd, D.M., **Mitchell, B**., The Strategic Marketing Function in Dynamic Markets, Polish Journal of Management Studies, Volume 12, No. 1, Pages 59 – 76, December 2015, ISSN 2081-7452
7. **Mitchell, B.**, Management of ICT-based Creative Industries – Has the Medium Muddled the Message?, International Journal of Cultural and Creative Industries, Vol. 3, Issue 2, March 31, 2016, pages 5-15, ISSN: 2309-6640 (print) 2311-9527 (online).

FULL PAPERS IN CONFERENCE PROCEEDINGS:

8. **Mitchell, B.,** Working Together? Interactions of Project Managers in the Adhocratic Team, Conference: 19th Annual Meeting of the American Society of Business and Behavioural Sciences, At Las Vegas, Nevada, USA, Volume: 19, No. 1, February 2012. (Conference Presenter),
9. Mako, C., Farkas, E., and **Mitchell, B.**, Emerging Segmented Capitalism in Hungary (Varieties in Employment Practices), International Conference for "Central and Eastern Europe: Work, Employment and Societies between Transition and Change", Universite d'Evry-Val-d'Essone, November 21 - 22, 2013
10. Mako, C., **Mitchell, B.**, and Mitra, J., Developing Dynamic Capabilities in the Firm: Growing Role of Innovation and Learning in the Labour Process, Conference: 12th Annual International Entrepreneurship Forum, At Vilnius, Lithuania, Volume: 12th, September 2013.
11. Mako, C., **Mitchell, B.**, and Fonger, J., Developing Dynamic Capability of the Firm: Increasing Role of Workplace Innovation (An International Comparative Perspective), Conference: European Congress, "Europe: Crisis and Renewal", Fitzwilliam College, Cambridge, Organizer: "British Association for Slavonic and East European Studies - International Council for Central and East European Studies, Fitzwilliam College, Cambridge, UK.
12. Koplyay, T., and **Mitchell, B.,** The Evolution of Complexity within the Firm, Proceedings of the Institute of Industrial Engineers (IIE), Industrial and Systems Engineering Research Conference (ISERC), Montreal, Quebec, Canada, June 2014. (Conference Presenter), ISBN 9781634393843.
13. Koplyay, T., and **Mitchell, B.,** The Evolution of Complexity in High Technology Markets, Proceedings of the Institute of Industrial Engineers (IIE), Industrial and Systems Engineering Research Conference (ISERC), Montreal, Quebec, Canada, June 2014. (Conference Presenter, and chaired the track session), ISBN 9781634393843.
14. Mako, C., Illessy, M., and **Mitchell, B.**, Innovation Landscape in Europe: Visible country differences (A Cross Country Comparison), Conference: New Trend in Management in the 21st Century - Cross-Atlantic Perspective, Czestochowa, Poland, 12 - 13 June, 2014.

15. Koplyay, T., and **Mitchell, B.,** Stability of Firms under nonlinear and linear market conditions, Proceedings of the Institute of Industrial Engineers (IIE), Industrial and Systems Engineering Research Conference (ISERC), Nashville, Tennessee, USA, May 2015. (Conference Presenter), ISBN 9781510813687.
16. Koplyay, T., and **Mitchell, B.,** Evolution of the firm and its alliance structural forms in dynamic markets, Proceedings of the Institute of Industrial Engineers (IIE), Industrial and Systems Engineering Research Conference (ISERC), Nashville, Tennessee, USA, June 2015. (Conference Presenter, and chaired the track session), ISBN 9781510813687.
17. Koplyay, T., **Mitchell, B.,** Cohn, S., and Fekete-Farkasne, M., Risk Profiles of Emerging and Established Value Chains in Dynamic Markets, International Federation of Automatic Control (IFAC), INCOM (Information Control Problems in Manufacturing) 15th Symposium, Ottawa, Ontario, May 11 - 13, 2015. (Conference Presenter, and co-chaired the track session with Dr. Fekete), http://dx.doi.org/10.1016/j.ifacol.2015.06.134 ISSN: 2405-8963.
18. Koplyay, T., Lloyd, D., Jazouli, A., and **Mitchell, B.**, Evolution of Structural Complexity in Market-Based Projects: The Case of the Mergers & Acquisitions, The Portugese Marketing Conference, October 29-30, 2015. Porto, Portugal.
19. Koplyay, T., Lloyd, D., Abdelkader, J., Fekete-Farkasne, M., and **Mitchell, B.,** The "Strategic Stretch": estimating levels of difficulty in introducing new products to a market, American Society for Engineering Management (ASEM), October 26 – 29, 2016, Concord, North Carolina, United States. ISSN 978-0-9975195-1-8.
20. Jazouli, A., Koplyay, T., **Mitchell, B**., and Motaghi, H., The Rise of Complexity Due to Stakeholders Structure Along the Lifecycle in Project Management Organizations, American Society for Engineering Management (ASEM), October 18-21, 2017, Huntsville, Alabama, USA
21. Jazouli, A., Koplyay, T., **Mitchell, B**., and Motaghi, H., The Influence of Innovation in Shaping Underlying Project Management Delivery Structure, American Society for Engineering Management (ASEM), October 18-21, 2017, Huntsville, Alabama, USA