



Amankwah-Amoah, J., & Wang, X. (2019). Contemporary business risks: an overview and new research agenda. *Journal of Business Research*, 97, 208-211. Article 97.
<https://doi.org/10.1016/j.jbusres.2019.01.036>

Peer reviewed version

License (if available):
CC BY-NC-ND

Link to published version (if available):
[10.1016/j.jbusres.2019.01.036](https://doi.org/10.1016/j.jbusres.2019.01.036)

[Link to publication record on the Bristol Research Portal](#)
PDF-document

This is the accepted author manuscript (AAM). The final published version (version of record) is available online via Elsevier at <https://doi.org/10.1016/j.jbusres.2019.01.036> . Please refer to any applicable terms of use of the publisher.

University of Bristol – Bristol Research Portal

General rights

This document is made available in accordance with publisher policies. Please cite only the published version using the reference above. Full terms of use are available:
<http://www.bristol.ac.uk/red/research-policy/pure/user-guides/brp-terms/>

Contemporary Business Risks: An Overview and New Research Agenda

Abstract

Joseph Amankwah-Amoah¹ and Xiaojun Wang²

1. Kent Business School, University of Kent, Canterbury, Kent, CT2 7FS
2. School of Economics, Finance and Management, University of Bristol, Bristol, BS8 1TZ, U.K.

Risk-taking is a pivotal feature of entrepreneurship and business development. Poor management of business risk often leads to the loss of competitiveness with the consequence of business failure, and in contrast, it improves business sustainability when risks are managed effectively. In this editorial, we present an overview of the literature on conventional business risks and new emerging risk with an attempt to clarify some key issues on the subject. This introduction depicts an illumination of the papers included in the special issue on ‘*contemporary business risks*’ and highlights several novel ideas, emerging trends and uncharted territories for future research.

Keywords: business risks, business failure; global environment.

Introduction

In an increasingly interconnected world characterised by declining trade barriers and communication cost, and technological developments, risks increasingly transcend national borders precipitating business failures in some instances (see World Bank, 2013). By business risk, we are referring to threats posed to the focal business stemming from the political, economic, societal and technological environment of the firm (Souder & Bethay, 1993). These risks may stem from unexpected changes in government policies and actions by rival firms. The nature of risks may involve aspects related to politics, cross-cultural issues, currency as well as both commercial and supply disruption risks (Cavusgil, Knight and Riesenberger, 2012; World Bank, 2013).

Over the course of this new century, a host of new and old threats including cyber-attacks, terrorism, food product safety in the developing world and cybercrimes have emerged or resurfaced, confronting businesses and triggering a quest for unique resources and expertise to respond. With an increasing reliance on information technology for most businesses, cyber risk presents a significant part of a company’s risk exposure. A single incident such as a technical glitch, human error or cyber-attack, often results in severe business interruption, loss of stock value and damage to company reputation. In 2017, an IT meltdown caused by human error led to travel chaos for 75,000 British Airway passengers (BBC 2017). In the same year, the National Health System (NHS) in the

United Kingdom experienced an unprecedented level of disruption after a ‘ransomware’ cyber-attack, which also affected many other organisations around the world including FedEx, Renault and Germany’s railways (O’Dowd 2017).

Academics have argued for decades that the management of business risk is central to any organisation and it is the determinant of which organisations survive and grow and which decline and fail (Amit and Wernetfelt 1990). Poor management of business risk results in the loss of competitiveness with the consequence of business failure, and in contrast, it improves business sustainability when risk is properly managed and mitigated. The main purpose of this special issue is to provide space for scholars to showcase new ideas and concepts in a quest for better understanding of business risks and the consequential business effect. In this introductory piece, our main objective is to outline some main types of business risks including emerging risks (e.g., cyber-attacks and incidents, disruptive innovations and technologies, and supply chain disruptions), introduce the papers in this issue and set our directions for new streams of research.

Contemporary Business Risks : an Overview

According to the Royal Society (1992), risk is defined as ‘the probability that a particular adverse event occurs during a stated period of time, or results from a particular challenge’ (p. 2). For business, risk is regarded as the potential threats to, and unwanted impacts on, a firm’s operations, reputational capital, market share and profitability, as a consequence of operational and strategic decisions, and the exogenous responses of other actors to these decisions (Graetz and Franks 2016). In this constantly and rapidly changing global environment, the decisions and events taking place within or outside the organisation can lead to internal and external risks. Internally, different types of business risk can occur ranging from strategic, financial, operational, compliance to other risks (Everett and Watson, 1998; Shepherd et al. 2000; Deumes and Knechel 2008; Wang et al. 2010; Wang, Li, and Shi 2012). Externally, there is a growing trend for business cooperation with various stakeholders (Kanda and Deshmukh 2008; Chen, Wan, and Wang 2017; Chen, Wang and Chan 2017). As a result, the external market environment and complex supply network also brings uncertainties that significantly threaten normal business operations of individual firms. These internal and external risks are further exposed and magnified by an increasingly unpredictable economic, natural and political environment including changes in registration and regulation (e.g. protectionism and economic sanctions) and natural catastrophes (e.g. storm, flooding and earthquakes).

Furthermore, the increased globalisation of the marketplace over the past few decades has generated a significant surge in the volume and variety of cross-broader transactions in goods, services and capital. Firms are therefore exposed to different types of risk when they actively extend their business operations in the international markets. In the international business study literature, business risk is broadly classified into four categories: commercial, country, cross-cultural, and currency risks. Here, commercial risk refers to the potential loss from the market or the transaction with business partners caused by various factors such as weak partners (Child and Yan 2003), operational problems (Wang, Tiwari and Chen 2017), timing of entry (Gaba, Pan, and Ungson 2002), competitive intensity (Boso, Cadogan, and Story 2012) or poor execution of strategy (Fawcett et al. 2015).

Country risk, defined as the probability of future events within a country that a given organisation's operation could be adversely affected, has received major concern among the business community for decades (Fitzpatrick, 1983; Brown, Cavusgil, and Lord 2015; Stevens, Xie, and Peng 2016). It is widely acknowledged in the existing literature that country risk is the consequence of country-specific contextual factors including political, social and economic aspects (Cosset and Roy 1991; Oetzel et al. 2001; Brown, Cavusgil, and Lord 2015; Khoury, Junkunc, and Mingo 2015). Both qualitative (e.g. expert assessment) and/or quantitative (e.g. econometric and statistical modelling techniques) approaches have been applied to measure the probability and severity of adverse effect to business profits and assets, taking into account the complexity of the political, social and economic aspects of risk when investing in a country.

Cross-cultural risk is another main type of business risk. Cultural differences between organisations/staff members, either at organisational or national level, may cause conflicts and affect performance if they are not managed correctly. Many previous studies show that cultural mismatch in communication, decision making styles and ethical practices are often among the key reasons contributing to the failure of business relationships (Rauch, Frese, and Sonnentag 2000; Meschi and Riccio 2008). Interestingly, in the context of international business, there are conflicting views among the existing studies about whether the national cultural difference between partners have a negative (Hennart & Zeng, 2002; Meschi and Riccio 2008), positive (Park & Ungson, 1997; Pothukuchi et al. 2002) or significant impact on survival of relationships (Fey & Beamish, 2001). Therefore, cross-cultural risk management makes a key significant difference between business success and failure.

Currency risk, defined by Adler and Dumas (1984) as statistical interpretation of deviations of the actual purchasing power of foreign or home currency from its originally anticipated value on a given future date, has been studied extensively in the finance and international business literature (Collier et al. 1990; Miller 1992; Walker 2008). It is widely acknowledged that currency risk originated from the currency exchange market should not just be the interest of financial specialists because it often creates problems and opportunities for many businesses. No matter the scale of business or the country base (e.g. multinational corporations and small firms), there will be some exposure to currency risk if the business incurs costs or earns revenue from other countries. Interestingly, opinions of whether currency risk should be fully, partially or not hedged are divided among the existing literature (Walker 2008).

New emerging business risks

Businesses are facing a host of new risks including cyber-attacks and incidents; the rapid speed of disruptive innovations and new technologies (e.g. artificial intelligence, robots and big data analytics); business interruption including supply chain disruption and vulnerability, and many others. This host of new risks requires businesses to re-think current tools and strategies that are deployed to monitor and manage risks.

Cyber-attacks and incidents have emerged as a significant business risk as a constant threat of exploitable vulnerabilities of cyberspace which could cause significant reputational and economic damages. We have seen an increasing number of high-profile, high-cost security breaches in recent years. For instance, Yahoo was reported as discovering a major cyber-attack, in which data from more than one billion user accounts were compromised in August 2013, doubling the number of affected accounts of another major breach in 2014 and making it one of the largest cyber security breaches in history (Goel & Perlroth, 2016). Accompanying the growing treats of cyber-attacks is the rising cost of cyber-attacks and incidents. Facebook, the social network firm, could face a \$1.63bn fine under the General Data Protection Regulation (GDPR) over its latest data breach which had impacted approximately 50 million accounts (Solon 2018). How to respond to cyber-attacks and manage risk has significant implications to most businesses. Amir, Levi and Livne (2018) found in their investigation that firms' equity values declined by 0.33% on average if firms immediately disclosed the cyber-attack. The decline of equity values amplified if firms take longer to disclose the cyber-attack encountered and the magnitude is even more significant if the outside parties discovered it. Facing the treats of cyber-attack, despite having access to basic tools associated with technology risk management, for many small businesses, there is a lack of policies, procedures and training to secure their information resources (Beery and Berry 2018).

Rapid technological advancement such as artificial intelligence, robots, 3D printing and big data analytics is transforming and disrupting firms across all industry sectors. While digitalisation and automation create new business opportunities, early adopters of these technologies have to bear substantial risk. For example, while the disruptive impacts of 3D printing on business model innovation and the supply chains have been extensively reported in the existing literature, there is also concern about how the technology increases competition (whether legal or illegal) from SMEs and individual entrepreneurs (Mohr and Khan 2015; Rayna and Striukova 2016). Airbnb, a new business innovation, has grown exponentially in the last few years, with millions of room nights sold through the Internet platform across the world. The rise of Airbnb has attracted wide debate about its potential disruption to the traditional tourism accommodation sector as well as its rental legality issue and tax concerns (Guttentag 2015; Zervas, Proserpio, and Byers 2017). In addition, an increasing reliance on technology and automation also means that technical IT failure or human error can halt production or service which results in costly damages. For instance, TSB, whose botched IT upgrade in April 2018 led to one of UK's worst banking outages, was hit by another technology glitch in September in the same year (Rumney 2018).

Supply chain risks have been extensively studied over the past two decades, as demonstrated in some recent comprehensive reviews such as Ho et al. (2015) and Heckmann et al. (2015). Supply chain management scholars tend to focus on risks related to demand, supply and process uncertainty, and coordination between supply chain partners due to the interrelation and increasing complexity of modern supply chains (Tang and Tomlin 2008; Wang et al. 2012; Chan and Wang 2013). In recent years, supply chain disruption risks as a consequence of natural disasters, labour strikes and terrorism have attracted considerable attention from both practitioners and academics (Kleindorfer and Saad 2005; Knemeyer et al. 2009; Scheibe and Blackhurst 2018). For instance, the 2011 earthquake and tsunami in Japan also severely disrupted global supply chains. In addition to the devastating human and environmental damage, the factories that manufacture semiconductor chips, automotive parts and other key components had to shut down or halt their productions in the earthquake/tsunami-affected region. There were knock-on effects in the domestic and global supply chains, particularly those related to aerospace, automotive, electronics, and semiconductor industries (Park et al. 2013). Taking the automotive industry as an example, Toyota incurred \$72 million per day additional cost due to supply chain disruptions caused by the earthquake/tsunami disaster (Pettit et al. 2013), and in the same year, the automotive supply chains had another severe disruption because Japanese automotive companies with plants in Thailand were disrupted by catastrophic flooding (Chopra and Sodhi 2014). The vulnerability of supply chain disruption risks

has been further exacerbated due to globalisation and the adoption of management practices (e.g., lean operation) in many business sectors including the automotive industry. Therefore, it is important to strike a balance between the operational efficiency and disruption risk for effective supply chain management (Kleindorfer and Saad 2005).

Overview of papers in this issue

Below, we provide a summary of the papers included in this issue. The first set of papers (Mamman et al. in this issue; You et al. in this issue; and Chen et al. in this issue) explore how country risk, particularly political risk, stems from government actions (or inactions) or regulatory changes impacting on business. For instance, with reference to recent policy failures in the pharmaceutical industry, Chen et al. (in this issue) evaluated the price cap regulations through modelling the pharmaceutical supply chain firms' decision behaviours and their economic and social performance under alternative regulatory settings. The research provided a novel approach for policy makers to foresee the policy impact on the regulated industry. As one of the papers on contemporary business issues, You et al. (in this issue) examined 'the state of technological progress in Africa by applying an innovative two-step total factor productivity (TFP) analysis and found that three convergence clubs with TFP levels relative to South Africa, where only most developed African countries have been able to catch-up' (p.1). Furthermore, Mamman et al. (in this issue) presented an interesting discussion of how SME policy and environmental conditions shapes development and role of SMEs focusing on Africa. The authors shed some light on SME policy and potential contributory factors to SME success or failure.

A number of papers (Min in this issue; Li et al. in this issue; and Russell et al. in this issue) focus on commercial risks. For instance, Min (in this issue) examined the mechanisms and timing of vicarious crises and their effects in terms of learning spill over through an analysis of the fatal events in the global airline industry from 1994 to 2012. The author found that 'nonlocal alliance partner's crisis can prevent future crises for a focal firm without performance downfall' (p.1). Li et al. (in this issue) investigated the dynamic capabilities of multinational companies (MNCs) operating in high-velocity industries in China using a qualitative multiple-case study. The research found that dynamic capabilities increase in complexity and frequency in this kind of market environment. Through a field study of the fast service restaurant market in New Zealand, Russell et al. (in this issue) examined consumers' continued relationships with a defunct brand and shed some light on some of the risk.

Focusing on emerging risks such as disruptive innovations and technologies and supply chain vulnerability, several other papers (Gozman and Willcocks in this issue; Sheng and Lan in this issue; and Tse et al. in this issue) explored the relationship between these risks and business failure/success. In the view of disruptive innovation of cloud technologies, Gozman & Willcocks (in this issue) examined risks in relation to cloud adoption, and the associated regulations and penalties for non-compliance. They emphasised the requirement for executives to innovate to manage compliance risk. In the business era in which the mass media plays a critical role, Sheng and Lan (in this issue) found, through an analysis of news coverage of Chinese underperforming listed firms over the period 2006–2017, that ‘firms whose stocks are put under ‘special treatment’ status due to consecutive annual losses experience greater news volume and lower news sentiment relative to other firms in the quarter in which the ‘delisting risk warning’ announcements are made’ (p.1). From the upstream supply chain quality risk perspective, Tse et al. (in this issue) found through an analysis of survey data from 209 Chinese manufacturers that risk management practices, namely supplier development and proactive product recall, significantly contribute to firms’ quality and financial performances.

Concluding Thoughts and Directions for Future Research

There are several fruitful directions for future research regarding business risk. There are new sources of threats to businesses that can cascade into small business failures. These sources include cyber-attacks against firms and resulting thefts of intellectual and key assets climaxing into failure (Dawson, 2018); the opportunities/threats of technological breakthroughs (e.g., artificial intelligence and robot technologies) on various industry sectors (Howell, 2015); and media coverage (particularly new media such as social media platforms) of company issues and the resulting financial impacts (Kölbel, Busch, and Jancso, 2017; Sheng et al. 2017). These new sources of risks in triggering business failure also require additional attention.

Decisions and events within or outside an organisation can all bring risks to business. The unintended consequences of these risks can negatively or positively impact businesses simultaneously. Therefore, it is important for managers to analyse trade-offs considering the contradicting negative and positive factors, rather than simply mitigating the risks (Shrader, Oviatt, and McDougall, 2000; Nooraie and Parast, 2016). Managers should be aware of the potential conflicts of interests and dilemmas that are often inherent in risk management decisions and actions. One future research avenue is to explore mechanisms and methods that enable an analysis of the trade-offs in a dynamic business environment.

Furthermore, it is essential to highlight the important roles of both qualitative and quantitative approaches in risk management. Despite the critique of quantitative approaches to risk management in measuring the effects of risky business decisions or aggregating firms' risk exposure, it is important to recognise the values of quantitative risk management models in triggering analytical and rigorous discussion among managers and stakeholders about the different types of risks encountered by firms (Tang and Musa, 2011). It is the combination of scientific rigor in surfacing and assessing risks and humanity in decision-making and resource allocation that enables managing and mitigating risk in an effective and efficient manner. One future research avenue is to explore mechanisms that support the integration of qualitative and quantitative approaches in risk management.

Acknowledgements

We would like to take this opportunity to thank the co-editors of JBR - Professors Naveen Donthu and Anders Gustafsson, for their guidance, advice and the opportunity to showcase these important and insightful works.

References:

- Adler, M. and Dumas, B., 1984. Exposure to currency risk: definition and measurement. *Financial Management*, 13(2) 41-50.
- Amir, E., Levi, S. and Livne, T., 2018. Do firms underreport information on cyber-attacks? Evidence from capital markets. *Review of Accounting Studies*, 23(3), 1177–1206
- Amit, R. and Wernerfelt, B., 1990. Why do firms reduce business risk? *Academy of Management Journal*, 33(3), 520-533.
- BBC (2017) British Airways says IT chaos was caused by human error, BBC Business News, <https://www.bbc.co.uk/news/business-40159202>, accessed on 26/10/2018
- Berry, C.T. and Berry, R.L., 2018. An initial assessment of small business risk management approaches for cyber security threats. *International Journal of Business Continuity and Risk Management*, 8(1), 1-10.
- Boso, N., Cadogan, J.W. and Story, V.M., 2012. Complementary effect of entrepreneurial and market orientations on export new product success under differing levels of competitive intensity and financial capital. *International Business Review*, 21(4), 667-681.
- Brown, C.L., Cavusgil, S.T. and Lord, A.W., 2015. Country-risk measurement and analysis: A new conceptualization and managerial tool. *International Business Review*, 24(2), 246-265.
- Cavusgil, S.T., Knight, G.A. and Riesenberger, J.R. (2012), *International Business: Strategy, Management, and the New Realities*, 2nd ed., Pearson Prentice Hall, Upper Saddle River, NJ
- Chan, H.K., & Wang, X., 2013. Fuzzy Hierarchical Model for risk assessment: principles, concepts, and practical applications, London: Springer.33(3), 520-533.
- Chen, X., Wan, N. and Wang, X (2017) Flexibility and coordination in a supply chain with bidirectional option contracts and service requirement, *International Journal of Production Economics*, 193, 183-192

- Chen, X., Wang, X., and Chan, H.K. (2017) Manufacturer and retailer coordination for environmental and economic competitiveness: A power perspective, *Transportation Research Part E: Logistics and Transportation Review*, 97,268–281
- Child, J. and Yan, Y., 2003. Predicting the performance of international joint ventures: An investigation in China. *Journal of Management Studies*, 40(2), 283-320.
- Chopra, S. & Sodhi, M.S. (2014). Reducing the risk of supply chain disruptions. *MIT Sloan Management Review*, 55, 73–80.
- Collier, P., Davis, E.W., Coates, J.B. and Longden, S.G., 1990. The management of currency risk: case studies of US and UK multinationals. *Accounting and Business Research*, 20(79), 206-210.
- Cosset, J.C. and Roy, J., 1991. The determinants of country risk ratings. *Journal of International Business Studies*, 22(1), 135-142.
- Dawson, M., 2018. Cyber Security in Industry 4.0: The Pitfalls of Having Hyperconnected Systems. *Journal of Strategic Management Studies*, 10(1), pp.19-28.
- Deumes, R. and Knechel, W.R., 2008. Economic incentives for voluntary reporting on internal risk management and control systems. *Auditing: A Journal of Practice & Theory*, 27(1), 35-66.
- Everett, J. and Watson, J., 1998. Small business failure and external risk factors. *Small Business Economics*, 11(4), 371-390.
- Fawcett, S.E., McCarter, M.W., Fawcett, A.M., Webb, G.S. and Magnan, G.M., 2015. Why supply chain collaboration fails: the socio-structural view of resistance to relational strategies. *Supply Chain Management: An International Journal*, 20(6), 648-663.
- Fey, C.F. and Beamish, P.W., 2001. Organizational climate similarity and performance: International joint ventures in Russia. *Organization studies*, 22(5), 853-882.
- Fitzpatrick, M., 1983. The definition and assessment of political risk in international business: A review of the literature. *Academy of Management Review*, 8(2), 249-254.
- Gaba, V., Pan, Y. and Ungson, G.R., 2002. Timing of entry in international market: An empirical study of US Fortune 500 firms in China. *Journal of International Business Studies*, 33(1), 39-55.
- Goel V, and Perlroth N. 2016, Yahoo says 1 billion user accounts were hacked. The New York Times. <https://www.nytimes.com/2016/12/14/technology/yahoo-hack.html>, accessed on 28/10/2018
- Graetz, G., and Franks, D.M., 2016 Conceptualising social risk and business risk associated with private sector development projects. *Journal of Risk Research*, 19(5), 581-601.
- Guttentag, D., 2015. Airbnb: disruptive innovation and the rise of an informal tourism accommodation sector. *Current Issues in Tourism*, 18(12), pp.1192-1217.
- Heckmann, I., Comes, T. and Nickel, S., 2015. A critical review on supply chain risk—Definition, measure and modeling. *Omega*, 52,119-132.
- Hennart, J.F. and Zeng, M., 2002. Cross-cultural differences and joint venture longevity. *Journal of International Business Studies*, 33(4), 699-716.
- Ho, W., Zheng, T., Yildiz, H. and Talluri, S., 2015. Supply chain risk management: a literature review. *International Journal of Production Research*, 53(16), 5031-5069.

- Howell, A., 2015. 'Indigenous' innovation with heterogeneous risk and new firm survival in a transitioning Chinese economy. *Research Policy*, 44(10), 1866-1876.
- Kanda, A. and Deshmukh, S.G., 2008. Supply chain coordination: perspectives, empirical studies and research directions. *International journal of production Economics*, 115(2), 316-335.
- Khoury, T.A., Junkunc, M. and Mingo, S., 2015. Navigating political hazard risks and legal system quality: Venture capital investments in Latin America. *Journal of Management*, 41(3), 808-840.
- Kleindorfer, P.R., & Saad, G.H. 2005. Managing disruption risk in supply chains, *Production and Operations Management*, 14(1), 53-68.
- Knemeyer, M.A., Zinn, W., & Eroglu, C. 2009. Proactive planning for catastrophic events in supply chains, *Journal of Operations Management*, 27(2), 141-153.
- Kölbel, J.F., Busch, T. and Jancso, L.M., 2017. How media coverage of corporate social irresponsibility increases financial risk. *Strategic Management Journal*, 38(11), 2266-2284.
- Meschi, P.X. and Riccio, E.L., 2008. Country risk, national cultural differences between partners and survival of international joint ventures in Brazil. *International Business Review*, 17(3), pp.250-266.
- Miller, K.D., 1992. A framework for integrated risk management in international business. *Journal of International Business Studies*, 23(2), 311-331.
- Mohr, S. and Khan, O., 2015. 3D printing and its disruptive impacts on supply chains of the future. *Technology Innovation Management Review*, 5(11), 20-25.
- Nooraie, S.V. and Parast, M.M., 2016. Mitigating supply chain disruptions through the assessment of trade-offs among risks, costs and investments in capabilities. *International Journal of Production Economics*, 171, 8-21.
- Oetzel, J.M., Bettis, R.A. and Zenner, M., 2001. Country risk measures: How risky are they? *Journal of World Business*, 36(2), 128-145.
- O'dowd, A., 2017. Major global cyber-attack hits NHS and delays treatment. *British Medical Journal (Online)*, 357, 1-2
- Park, S.H. and Ungson, G.R., 1997. The effect of national culture, organizational complementarity, and economic motivation on joint venture dissolution. *Academy of Management Journal*, 40(2), pp.279-307.
- Park, Y.W., P. Hong, J.J. Roh. 2013. Supply chain lessons from the catastrophic natural disaster in Japan. *Business Horizons*, 56, 75-85.
- Pettit, T. J., Croxton, K. L. & Fiksel, J. (2013). Ensuring Supply Chain Resilience: Development and Implementation of an Assessment Tool, *Journal of Business Logistics*, 34, 46–76
- Pothukuchi, V., Damanpour, F., Choi, J., Chen, C.C. and Park, S.H., 2002. National and organizational culture differences and international joint venture performance. *Journal of International Business Studies*, 33(2), 243-265.
- Rauch, A., Frese, M. and Sonnentag, S., 2000. Cultural differences in planning-success relationships: A comparison of small enterprises in Ireland, West Germany, and East Germany. *Journal of Small Business Management*, 38(4), 28-41.
- Rayna, T. and Striukova, L., 2016. From rapid prototyping to home fabrication: How 3D printing is changing business model innovation. *Technological Forecasting and Social Change*, 102, 214-224.
- Rumney, E, 2018, TSB hit by another IT glitch, angering some customers, Reuters, Business News, <https://uk.reuters.com/article/uk-britain-tsb-outages/tsb-hit-by-another-it-glitch-angering-some-customers-idUKKCNILJIGX>, accessed on 26/10/2018
- Scheibe, K.P. and Blackhurst, J., 2018. Supply chain disruption propagation: a systemic risk and normal accident theory perspective. *International Journal of Production Research*, 56(1-2), 43-59.

- Shrader, R.C., Oviatt, B.M. and McDougall, P.P., 2000. How new ventures exploit trade-offs among international risk factors: Lessons for the accelerated internationalization of the 21st century. *Academy of Management Journal*, 43(6), 1227-1247.
- Sheng, J., Amankwah-Amoah, J. and Wang, X., 2017. A multidisciplinary perspective of big data in management research. *International Journal of Production Economics*, 191, 97-112.
- Shepherd, D.A., Douglas, E.J. and Shanley, M., 2000. New venture survival: Ignorance, external shocks, and risk reduction strategies. *Journal of Business Venturing*, 15(5-6), 393-410.
- Solon, O. 2018, Facebook faces \$1.6bn fine and formal investigation over massive data breach, The Guardian News, <https://www.theguardian.com/technology/2018/oct/03/facebook-data-breach-latest-fine-investigation>, accessed on 02/11/2018
- Souder, W. E., & Bethay, D. 1993. The risk pyramid for new product development: An application to complex aerospace hardware. *Journal of Product Innovation Management*, 10(3), 181-194.
- Stevens, C.E., Xie, E. and Peng, M.W., 2016. Toward a legitimacy-based view of political risk: The case of Google and Yahoo in China. *Strategic Management Journal*, 37(5), 945-963.
- Tang, C., & Tomlin, B. 2008. The power of flexibility for mitigating supply chain risks, *International Journal of Production Economics*, 116, 12-27.
- Tang, O. and Musa, S.N., 2011. Identifying risk issues and research advancements in supply chain risk management. *International journal of production economics*, 133(1), 25-34.
- The Royal Society (1992), Risk analysis, perception and management, Report of a Royal Society study group. London: The Royal Society
- Walker, E., 2008. Strategic currency hedging and global portfolio investments upside down. *Journal of Business Research*, 61(6), 657-668.
- Wang, X., Chan, H.K., Yee, W.Y., and Diaz-Rainey, I., (2012) A two-stage Fuzzy-AHP model for risk assessment of implementing green initiatives in the fashion supply chain, *International Journal of Production Economics*, 135(2), 595-606
- Wang, X., Li, D., O'Brien, C. and Li, Y., (2010) A production planning model to reduce risk and improve operations management. *International Journal of Production Economics*, 124, 463-474
- Wang, X. Li, D. and Shi, X., (2012) A fuzzy enabled model for aggregative food safety risk assessment in food supply chains, *Production Planning and Control*, 23(5), 377-395
- Wang, X., Tiwari, P. and Chen, X., 2017. Communicating supply chain risks and mitigation strategies: a comprehensive framework. *Production Planning & Control*, 28(13), 1023-1036.
- World Bank (2013). *Risk and opportunity: Managing risk for development*. Washington DC: International Bank for Reconstruction and Development/World Bank.
- Zervas, G., Proserpio, D. and Byers, J.W., 2017. The rise of the sharing economy: Estimating the impact of Airbnb on the hotel industry. *Journal of Marketing Research*, 54(5), 687-705.