Welcome to this first edition of Research, showcasing original and innovative research from across the University of Liverpool Management School. In this first edition we showcase the ground-breaking thinking of colleagues in their respective areas of expertise and how they are driving positive, impactful change outside of the School.

The impact that our research makes to wider society lies at the heart of the School’s vision, where we strive to be “a globally connected Management School advancing influential knowledge leadership through our transformative research and teaching to better business and society.”

Much of my work is making sure that structures are in place to enable all types of research to thrive throughout the School, building and maintaining an inclusive research culture for all our staff, from early career doctoral researchers just beginning their research career, to ensuring we have an engaged community of Professors leading in their respective fields. I am delighted that this is recognised externally.

The School is amongst an elite group of business schools worldwide to hold the gold standard ‘triple-crown’ of accreditations (EQUIS, AACSB and AMBA). We also hold accreditations that demonstrate our work in the community, notably the Small Business Charter. In addition, in December 2020 we became only the third UK business school to receive the Athena SWAN silver award, indicating our commitment to gender equality and diversity. In practice what this means is that we ensure an inclusive environment is embraced by implementing a framework across all areas of staff recruitment and development.

No business school can, or should, act in isolation so it is particularly pleasing that many of the authors showcasing their research in this edition of Research conducted their research as part of a national or international team. A globally connected and recognised research community is core to the School’s collegiate and collaborative research culture supporting academics at all career stages. This collaborative culture is fostered within the School through interdisciplinary Research Clusters and Centres that bring together faculty and disciplinary expertise from our six Subject Groups to facilitate internal and external research partnerships, around common cross-cutting research themes and projects. We showcase one of the centres, The Centre for Supply Chain Research, in this edition.

I am delighted to lead such a progressive and forward-looking School and I trust you will enjoy reading this edition of Research.

Professor Julia Balogun
Dean, University of Liverpool Management School and The Brett Chair in Management
In their research, Jo and Bruce both draw on their extensive professional backgrounds in procurement and commercial management working for global organisations. Since 2018, Jo and Bruce have been working closely with the Crown Commercial Service (CCS), the UK’s largest public procurement organisation. CCS bring together policy, advice, and procurement services for UK central government and over 18,000 organisations in the wider public sector. CCS wanted to explore how their key suppliers were responding to the UK Government’s Modern Slavery Act that came into force in 2015. The Act’s (Section 54) Transparency in Supply Chains (TISC) provision places an annual public reporting obligation on firms with a turnover of over £36m to report either the steps taken to ensure slavery is not taking place in their operations and supply chains, or to confirm that no action has been taken.

Modern slavery in supply chains is a relatively new area of academic study, and given the recency of the legislation, much of the existing work focused on firms’ technical compliance to the TISC provision. By examining firms’ TISC statements however, Jo and Bruce saw a new opportunity to contribute to this emerging field. They identified that the TISC Statements of many firms just appeared to ‘tick the box’. Although these firms were technically compliant, what was of interest was not just what the companies said they were doing to guard against modern slavery but, more importantly, what they were not saying. In parallel, Jo and Bruce were analysing the raft of policy guidance, parliamentary debates on the passing of the Modern Slavery Act, and official independent reviews of the Act, to get a deeper understanding of the policy intent behind TISC statements. The research, which has been recently published in the International Journal of Operations and Production Management (February 2021), revealed how the use of ambiguity in TISC statements can reduce firms’ accountability and delay action on addressing modern slavery in corporate supply chains. While this might reduce a firm’s reputational risk, it provides an explanation for the slow pace of change, and crucially can have profound negative consequences for people in forced labour.

The work on ambiguity led to collaborative research and wider dialogue not only with the CCS, but also the Home Office’s Modern Slavery Unit and the Cabinet Office, who are responsible for setting policy and commercial standards, and the Ethical Trading Initiative (ETI). TISC statements are commonly used by researchers, and procurement decision makers, as a proxy for action. Using their commercial knowledge, Jo and Bruce recognised the complexity of identifying and tackling modern slavery in supply chains, particularly beyond direct tier-one suppliers, and have sought to explore what organisations were doing differently in their day-to-day procurement practice, beyond their published statements, to ensure due diligence in their supply chains.
A human issue not a supply chain issue

In the summer of 2019, Jo, Bruce, and Nathan Davies, a PhD student working with the team, conducted extensive research with three construction companies, all of which were suppliers to the UK government. The construction sector commonly has fragmented supply chains, a high use of subcontracting that obscures transparency, transient and low-skilled labour, and a high use of extracted raw materials; all factors that increase workers’ vulnerability to modern slavery. The three companies were all actively working on policies and practices to identify and eradicate modern slavery, and the team interviewed a range of decision makers spanning procurement, operations, finance, and human relations.

In addition to revealing the operational challenges of tackling modern slavery in complex, opaque, supply chains, analysis of the data revealed insights into potential mechanisms for transformational change in the level of engagement and prioritisation of modern slavery. The research uncovered how and why some had become advocates for driving industry-wide change. In the commercial process of procurement and supply chain there is often little, if any, human connection or interaction with workers in the supply chain.

Corporate training programmes that went beyond outlining legal duties and also involved hearing the stories of victims of modern slavery, shifted peoples’ view and it became not just a contractual issue but a human issue – they understood how that person’s life had been affected and they had an emotional response to the impact of modern slavery.

The results from the construction project supported those from a piece of work by Jo and Olly Kennedy, another PhD student in the team, exploring the role of ‘place’ in the modern slavery policy agenda. The project engaged a range of public, private, and third sector organisations from the Liverpool City Region (LCR), to assess the potential for regional policy to support national legislation and industry-focused collaboration in eradicating modern slavery in supply chains. The evidence emerging from this research also identified the importance, and often absence, of moral triggers in the procurement process, and interestingly what the research team terms ‘the boundaries of care’. For example, people cared about their businesses, their workers, and their region, but these boundaries are arguably paradoxical to the unbounded nature of modern slavery. It was clear from both the construction and the LCR research that what people see and what people do, are inextricably linked. The TSC legislation focuses on transparency, yet because of the structural complexity of corporate supply chains, organisations are still learning how to see the problem of modern slavery, and where to look for it. The issue here centres largely on the lack of supply chain visibility, or perhaps more importantly, the lack of visibility of workers in the supply chain processes.

Building the understanding

Policies which implement change across supply chains are underdeveloped in this area, something Jo, Bruce, and the team, are keen to change. They have secured funding from various research councils, and are working with the Modern Slavery Policy and Evidence Committee, as well as an international network of policy makers, NGOs, businesses, and academics to build a critical mass of impactful research activity. The next phase of Jo and Bruce’s research is looking at how the ‘boundary of care’ can be extended to reach further down the supply chain, both at company and individual levels. They are working with industry and policy makers to develop methods to humanise the supply chain process in order to reframe risk beyond corporate reputation, and to consider risks of vulnerable workers. Part of the solution is likely to be found in challenging the artificial boundaries of our systems, whether that be economic, health, environmental, or supply chain systems. Working at the intersections of systems forces us to take account of non-commercial issues and recalibrate concepts of risk and responsibility. To bridge the ‘seeing’ and ‘doing’ gap, the team is exploring opportunities to work with colleagues across the faculty to see how literature and art can be used to encourage us all, organisations and consumers, to rethink our sourcing decisions and humanise our supply chains.

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Problem gambling is estimated to affect 400,000 people in Britain, representing a public health issue associated with serious social harms. How can the Government, the regulator, and gambling companies help problem gamblers whilst maintaining what is an enjoyable social activity for the majority who only place the occasional bet? And what steps can the industry take to identify those at risk of becoming a problem gambler in the future? Ian and David have used their respective expertise to study datasets enabling the sector to understand the behavioural patterns of gamblers and to implement change.

We are pleased to say that as a result of the research by Ian and David, and Ian’s subsequent tailoring of an algorithm for our operation, we feel we now offer a safer gaming environment.

Simon Thomas
Chief Executive
The Hippodrome

The gambling industry is heavily regulated with a number of key stakeholders exerting influence and informing regulatory change. Having worked in partnership with the sector for many years Ian and David were able to source datasets from major gambling organisations, enabling them to analyze data detailing individual gamblers account information. Amongst the datasets they sourced were those tracking gamblers through the use of loyalty cards both online as well as those visiting physical venues, e.g. casinos and bookmaker shops. They were able to ascertain patterns of behaviour such as typical amounts spent, time spent and when during the day bets were placed, and also changes in these patterns of play providing insight into different betting contexts.

Fixed Odds Betting Terminals
The Department for Digital, Culture, Media and Sport (DCMS) is the UK government department with responsibility for gambling. During its terminal review of the limits placed on stakes, prizes, and provision of gaming machines it considered reducing the maximum stake of £100 allowed on fixed odds betting terminals in bookmaker shops, as many across the sector felt the stake was too high. The suggestion was to reduce the maximum stake to £50. DCMS commissioned Ian and David to examine data from the terminals to ascertain whether limiting the maximum stake to £50 would reduce the harm caused to problem gamblers. Their research suggested it would not have the desired effect, suggesting that gamblers spent much longer on the machines when the stake was halved but ultimately spent just as much money as they had done before. The Gambling Commission used these findings to inform its decision to lobby the Government for stronger protections for gamblers using these machines, with the Government subsequently significantly reducing the maximum stake to £2.

The Hippodrome design algorithms now use this insight to identify loss-chasing among its loyalty card customers, using it as an identification trigger to encourage safer play.

Targeted approach
The evidence from all Ian and David’s research demonstrates the benefits of targeting interventions at those likely to be experiencing harm. Identifying individual customers exhibiting signs of problematic play allows them to benefit directly from targeted intervention in real time. Not only is this effective but it removes universally applied restrictions that would affect the consumer satisfaction of recreational gamblers. As Ian says, “ultimately, the end beneficiaries are individual customers, both those who play safely and those who are vulnerable to harm”.

Chasing losses
Ian and David’s body of research prompted a number of gambling companies to seek guidance as to how they could employ algorithms to make their gambling environments safer. This included Skybet, a leading online betting operator which specializes in football betting whose customer base includes a high proportion of young males. Responding to research findings which showed an exceptionally high incidence of new-onset problem gambling between ages 18 and 20, it has introduced lower thresholds for actively intervening when flagged cases of possible harm relate to the youngest age group in its customer base. Ian and David helped Skybet identify players chasing losses, setting up ‘triggers’ in the system where interventions will encourage safer play. The algorithms are detecting gamblers who return to gambling sooner, or increase stake sizes, in response to losing. The algorithms also identify patterns of time and money spent. For example, the analysis indicated that those who are betting late at night spend at a much faster rate than they do during daytime sessions.

Casinos
The Gambling Commission is charged with ongoing modification of the Licence Conditions imposed on operators to make gambling safer. The Commission used research by Ian and David to argue for increased levels of player protection for those using gaming machines in casinos. The Commission wanted to understand whether player protection tools that are in place for one type of machine (“B1”) are a category of gaming machines with a £5 maximum stake and £10,000 maximum prize limit should be extended to another type of machine (“B2” machines have a £2 maximum stake and a £500 maximum prize limit). Ian and David’s research findings suggested the protections should be extended with their findings acted upon by the Commission leading to closer monitoring of machine play in casinos with appropriate interventions by the operator where problematic play was detected.

The country’s busiest casino, The Hippodrome, asked how their research and David’s in the last three years has made an impact on regulatory thinking and decision-taking.

Tim Livesey
Head of the Safer Gambling Team
Gambling Commission

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The research of Ian and David has directly influenced how we approach our processes for responsible gambling.

Ben Wright
Head of Safer Gambling
Skybet
The University of Liverpool Management School has achieved the Athena SWAN silver award, indicating its commitment to gender equality and diversity.

Athena SWAN was established in 2005 and is a framework used across the globe. It encourages and recognizes good practices in higher education and research institutions towards the advancement of equality and diversity. Professor Julia Balogun, Dean of the Management School, commented: “The Management School is incredibly proud of this achievement, particularly as we are only the third Business School in the UK to achieve the silver award. Thank you to everyone who contributed to this award and we look forward to continuing to support and advance the progression of all staff and students within the ULMS community.”

In order to qualify for the silver award, institutions must demonstrate how equality and diversity is well embedded. They must also show strong leadership in promoting the principles of the charter and evidence of impactful Athena SWAN activities.

The University of Liverpool Management School has developed a new MSc Financial Technology programme to add to its suite of postgraduate courses.

Financial Technology, or FinTech, is widely regarded as the future of finance. Technology such as blockchain and cryptocurrencies may be making the headlines but, according to the UK’s Department for International Trade, FinTech also has the potential to increase transparency and efficiency in the financial sector and give the most vulnerable in society access to financial services.

The new MSc Financial Technology programme at Liverpool will provide students with expert global knowledge on both the academic and commercial aspects of this evolving area of finance. Graduates from the programme are likely to pursue a career in financial or legal sectors particularly in the specialisms of financial markets, risk, trading, Python, banking, LawTech, payments and settlements, cryptocurrencies, regulations, entrepreneurship, research, government agencies, international financial agencies and higher education.

Gavin Brown, Director of Studies for the MSc Financial Technology, said that: “Financial services are undergoing the fastest pace of change in human history enabled by multifaceted technological changes. Our new programme in MSc Financial Technology ensures that University of Liverpool graduates understand the commercialisation of these changes and are ready for the future of finance and the opportunities that this brings.”

More information regarding the programme can be found on the MSc Financial Technology study page.

The Management School has achieved its position by 20 places in The Economist Which MBA? global rankings. The Management School has improved its position by 20 places in The Economist Which MBA? global rankings.

The 2021 ranking includes 90 full-time MBA programmes from around the world – only ten of which are based in the UK. The position of each programme is determined by a number of factors including graduate salaries, networking opportunities, personal development, educational experience and career opportunities.

Professor Stephen Woods, Associate Dean MBA, said “As a programme team, we are thrilled to again appear in the Economist rankings, and to have improved our position. Along with our recent accreditation by AMBA, it marks a year of achievements for the MBA programmes, in challenging circumstances.”

“It was especially pleasing to see recognition of our excellent student diversity and record of student employment within three months of graduating, student diversity and student quality.

Professor Parsons, Athena SWAN Academic Lead, commented: “The Athena SWAN charter has allowed us to implement some really positive changes in the School. It is great to see that these efforts have been acknowledged and we will continue to develop more opportunities for our staff and students.”

Recent policy developments include the introduction of a “reintegration allowance” for individuals returning from paternity/adopted parental adoption leave. The School has also implemented initiatives to improve gender balance on some of our programmes, for example, the creation of Women in Football scholarships for applicants to the Football Industries MBA programme.

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The Centre for Supply Chain Research is comprised of 22 members and 20 PhD students. Centre members have research published in some of the top journals in the field including Management Science, Journal of Operations Management, Transportation Research Part B, International Journal of Operations & Production Management, European Journal of Operational Research, and the Journal of Service Research, and also work closely with the public sector in impactful action research and knowledge exchange, typically funded by national and international funding bodies such as Innovate UK, NERC, BEIS, Leverhulme and H2020.

Recent Funded Projects

NERC Recycled plastics – Understanding the quality-performance linkage for packaging
Andy Lyons and Gopal Narayanamurthy are Co-I’s on a Natural Environment Research Council (NERC) award of £975,000. The project, led by UoL’s Department of Chemistry, is a three-year, Smart Sustainable Plastic Packaging study, aiming to understand how changes in chemistry control the properties of plastic packaging. The research will provide: a robust understanding of the relationships between the chemistry and properties of recycled plastics; an evaluation of the effect of additive use in recycled plastics on packaging performance; and, recommendations for preventing recycling degradation through additive and formulation changes. Based on these outcomes, ULMS staff are responsible for creating a profiling framework in order to collect data and analyse the performance of using different configurations of recycled plastic and by modelling the interplay across the financial, social and environmental dimensions of different supply and demand scenarios, thereby assisting in the understanding of the economics of using additives; and better understanding and targeting the market for recycled plastics.

Innovate UK

Innovate

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Transport and Logistics

Modelling and optimisation of problems in the design, planning and operation of transportation networks for the distribution of freight; container shipping, empty container/vehicle positioning and ship loading; vehicle routing problems in road transportation; multi-commodity network design; service network design and facility location.

Supply Chain Technologies, Analytics and Risk

Digital strategies and ICT adoption in operations and supply chain management; uncertainty and risk mitigation; mathematical programming, stochastic dynamic programming and meta-heuristic optimisation of supply chains; development of models and algorithms to support supply chain network design; understanding big data analytics in operations and supply chain management; last-mile solutions; capacity analyses of rail networks and railway timetabling.

Sustainable Supply Chains

Green supply chain management; carbon footprinting of logistics systems; environmental policies and operations and supply chain design; integrating sustainable practices with operations and supply chain performance; sustainable procurement; modern slavery and supply chain ethics.

Agri-Food Supply Chains

Food waste reduction; integrating local and global food production systems; inventory and pricing strategies for perishable food supply chains; decision support systems in food supply chains.

Agile Operations

Organisational agility; management practices and the performance and productivity of small firms; sustainable growth of SMEs.
This research has advanced organizational attitudes towards flexible working leading to targeted family friendly education by prominent family and gender-oriented charities and consultancy. These education programmes have reached over 150 organisations, resulting in changed behaviours among managers and employees. A number of research projects have contributed to the findings and recommendations:

- Laura studied couples’ everyday work–family decision-making practices using daily diaries, and found that inequality persisted among couples when women accessed family-friendly policies but men did not, with women taking on most care-giving tasks and managing daily conflicts alone, leading to stress and reduced engagement at work. Thus she identified that encouraging men in heterosexual couples to access flexible working can be key to resolving work–family conflicts in a gender egalitarian manner, reducing stress, promoting gender equality, and aiding work–family balance within couples.

- Insights from a survey by Laura of over 10,000 working parents provided evidence of specific barriers preventing male access, as well as enablers that can support uptake. The research showed that while men feel ‘entitled’ to seek promotion and advancement at work, they are less confident in requesting flexible working for family reasons. Barriers include line manager attitudes, a lack of transparency when flexible working options are available and that flexible working options tended to be targeted to women. Enablers include greater transparency about family-friendly options and ensuring that organisational and managerial presentation of such options are aimed at men as well as women.

- Caroline identified a mismatch between maternity and breastfeeding advice aimed at mothers, and what organisations do in practice to enable mothers to adhere to this advice, meaning new mothers struggle to meet health guidance whilst also proving themselves at work. In a study of new mothers’ work experiences she found that organisations often treat the ‘maternal’ body with suspicion rather than support. Just as assumptions are made about women not being responsible for caregiving, assumptions are made about returning mothers being less committed, contributing to the under-representation of women at senior levels in management. She found that women returning to work after maternity leave, often struggled to follow health guidance around breastfeeding, for example, whilst also demonstrating they were effective and present in performing their jobs.

Taken together, these insights highlight the need for organisational action and culture change that goes beyond development of policies, to actions that encourage and support men to take up policies, while concurrently improving support for women post-maternity. Using this research Caroline and Laura have worked with charities and consultancy who influence and educate corporate employers to effect change through encouraging a focus long-term on changing attitudes towards gender and family-related policies. The charities and consultancies they have worked with include WOMBA (Work, Me and the Baby), Avenir (leadership) Consulting, Working Mums (the #1 job and community site for working mums in the UK), and Business in the Community (BITC - the largest business-led membership organisation dedicated to responsible business).

Caroline’s research is also cited extensively in policy documents. In relation to fathers these include: the (2015) Scottish Government report: Fathers in the early years: How do they balance their work and family life? Family Friendly Working Scotland and also the Fatherhood Institute. Report by Burgess, A., and Dawkes, J. (2017) Cash or Carry? Fathers Combining work and care in the UK, Marlborough, Fatherhood Institute www.fatherhoodinstitute.org/wp-content/uploads/2017/12/Cash-and-carry-Full-Report-PDF.pdf. In relation to mothers, these include a 2014 report commissioned by the International Labour Organization: Lewis, S., Stumbitz, B., Miles, L., & Roux, J.(2014) Maternity protection in SMEs: An international review. International Labour Organisation. www.ilo.org/global/publications/ilodatastore/order/online-books/WCMS_312783/lang-en/index.htm. The International Labour organisation reviews key international literatures on maternity protection in SMEs for the purpose of generating positive outcomes for business and society in relation to policy and practice. In addition, Caroline was Academic Advisor for BIS (2015) research paper #235, Pregnancy and Maternity Related Discrimination and Disadvantage. Equality and Human Rights commission, First findings, surveys of employers and mothers. Through follow-up with organisations, Caroline and Laura have identified that organisations have since enhanced their policies, increased access to and transparency of these policies and promoted them better to men (ensuring representation of men in family-friendly campaigns for example) to encourage more uptake. In some cases, there has indeed been more uptake from employees with families and more ‘acceptance’ by others within organisations of those employees who choose to do so. Men have welcomed the opportunity to discuss flexible-working with managers, and some organisations developing specific improvements in paternity policies. This, in turn, has helped women advance in their careers where equal uptake of flexible working opportunities has supported more equal distribution of care-giving within the household.

Ongoing research projects conducted by Caroline and Laura explore the experiences of more diverse family types. Findings from research conducted by Laura, focusing on single mothers, for example, indicate the negative impact that organisational ideal worker norms, with limited flexibility options, can have on single parents.
The financial crisis of 2008 triggered a collapse in productivity growth, which has not caught up with the previous underlying trend since. This seems to odds with the proliferation of information technology, artificial intelligence, and automation of the last couple of decades and the presumption by many that these technologies would lead to higher productivity. This productivity puzzle has been widespread in OECD countries and more recently has also been seen in emerging economies. Why have increasingly powerful and economically viable IT solutions not led to higher national productivity levels?

The study

Joep, working collaboratively with colleagues, was able to dissect an exceptional data set of all Belgian business-to-business IT purchases to analyze the financial return companies received from spending on IT. Data was analyzed by year (the data set was from 2002-2018), by different industry sectors, and by company size. The data showed that on average a company who invested €1 in IT saw a return of €1.35.

Large or small?
The data showed that for very small firms (with less than 5 employees) increasing IT capital by 1% pushed the firm’s value added up by 0.08% on average. For firms with more than 250 employees, the impact is more than twice as high with an average increase in value added of 0.17%.

Put another way, investing €1 more on IT in a very small company will result in €0.92 increase in value added. The same investment in businesses with more than 250 employees has a €2.55 return. From this, it would seem logical to expect large firms to invest a larger share of their revenues in IT than small firms. However, it turns out that large firms have invested relatively less than small ones in new IT. This suggests that there is an untapped potential for productivity growth through investment in IT, especially in large companies, where typically a large proportion of the working population throughout the OECD are employed. Joep therefore argues that greater investments in IT by large firms will very likely boost wider productivity growth.

Industry sectors

Unsurprisingly the most IT-intensive industries gain the most from continuing to invest in IT — such as information/communication, and financial/insurance. While all firms benefit from investing in IT, it is the largest firms that benefit most.

A COMPANY WHO INVESTED €1 IN IT SAW A RETURN OF €1.35.

The returns from investing in IT are relatively high with a return of €1.50 added value for every €1 of extra investment in IT. Since in Belgium these industry sectors alone employ 35% of the workforce, and there are similar levels of employment in these sectors across the OECD, Joep’s research suggests that these industries would realize substantial productivity gains by investing in IT.

Of course, not all firms in the same industry sector are equally productive; there are large differences in production efficiency between companies. However, the research shows a clear link between the amount of IT invested (per employee) and higher levels of productivity when mapped by industry sector and percentile. For example, average IT investments per employee are about five times as high for a firm in the 90th percentile compared to a firm in the 10th percentile when mapped by productivity.

2008

Through the data Joep can identify a clear correlation between IT investment and national GDP and productivity growth across the Belgian economy. This changes quite clearly in 2008 when it seems that the financial crash and subsequent recession resulted in firms forgoing investment in IT. Given the relationship between investing in IT and improved productivity it is clear that post-recession underinvestment in IT had a scarring effect on the Belgian economy and is contributing to the lack of GDP growth seen since then. Based on the research, Joep argues that although the data set he and his colleagues scrutinized contained detailed information on only Belgian IT expenditure, given the similarities between its economy and many other OECD nations, the link between IT spend and productivity could answer many nations’ challenges around flat-lining economic growth.

Do all companies benefit from investing in IT or do some profit more than others? And how does any benefit secured feed into the wider productivity puzzle felt throughout OECD countries?

Joep Konings research explores these questions.

THE BENEFITS OF INVESTING IN IT

TAKEAWAYS FROM JOEP’S RESEARCH

It is clear that investments in IT of firms are very closely related.

While all firms benefit from investing in IT, it is the largest firms that benefit most.

The returns from investing in IT are relatively high with a return of €1.50 added value for every €1 of extra investment in IT even in industries which are traditionally associated with relatively low-productivity.

For regional, national and international policy makers IT investment has the potential to act as a key stimulus with the potential to help to reinvigorate productivity growth, suggesting the importance of taking a granular approach to macroeconomic challenges.
Creating a Framework to Understand Digital Service Innovation

Product manufacturers have long sought to gain competitive advantage through the use of services to support their physical value chain (often termed ‘servitisation’). Whilst the proliferation of digital technologies (the Internet of Things, cloud computing, block-chain, AI etc.) has provided these manufacturers with the technical opportunity to create an end-to-end value chain through interoperability (often termed digitalisation), much is already understood about both but research from Chris Raddats is adding to what we know about the intersection of servitisation and digitalisation known as digital service innovation. How are digital technologies and the Internet of Things helping manufacturers with the service elements of their business? And is there more commercial advantage to be gained from incremental or radical digital service innovations?

Chris and his academic colleagues, have engaged directly with product manufacturing companies to accurately represent the challenges and opportunities they perceived from digital technologies. He interviewed senior managers from 20 manufacturers of varying sizes from four distinct sectors whose companies were involved in digital service innovations. By taking the five criteria and applying an innovation perspective to digital servitisation, Chris has developed a framework (see Figure 1) which enables manufacturers to evaluate and prioritise their digital service innovations. This framework uses two dimensions identified from Chris’ research as significant for all manufacturers when considering digital service innovations:

- the level of innovation (from incremental to radical), and
- the impact of the innovation (and who benefits most, the manufacturer or their customer).

Using the framework

This framework for digital servitisation has important implications for manufacturing companies, demonstrating that they need to consider both how innovative the change is but also the impact it might have, both to their organisation as well as their customers. A digital service innovation can be radical for the manufacturer in terms of the capabilities needed to develop and deliver it, yet incremental for the customer in terms of its impact. Innovations that are perceived to be of incremental importance for the manufacturer (such as the example of a customer app or web portal given in the framework) can still have a profound impact on the customer. Such an innovation can help to provide visibility of how a product is performing, which can provide a customer with greater confidence in a manufacturer’s ability to deliver the contracted services. This could lead to the customer inviting the manufacturer to provide higher value service offerings, such as availability or outcome-based advanced services. Conversely, the adoption of algorithms to predict equipment failure is a more radical form of innovation for the manufacturer, since this requires major investment to implement.

However, although this innovation may bring benefits to the manufacturer, the framework highlights that this may not be perceived in the same way by the customer, since preventive maintenance is already something provided by experienced service engineers, in terms of their ability to predict likely product failures.

Applying the framework

By using the innovation perspective of this framework, it is possible to better qualify the cost-benefit of digital service innovations for both manufacturers and their customers. Manufacturers using this framework can identify where the real customer value lies and prioritise their innovation activities accordingly.

Figure 1

DEVELOPING A FRAMEWORK

FROM THE RESEARCH CHRIS WAS ABLE TO IDENTIFY FIVE BOARD CATEGORIES OF DIGITAL SERVICE INNOVATION. THE FIVE CATEGORIES ARE:
INFLUENCING PATENT PRACTICES & POLICIES GLOBALLY

Legally the exclusive right granted to a patentee prevents others from making use of the claimed invention, but in practice the enforcement of this is far from straightforward. Professor Nick Papageorgiadis has been researching the international use of patents and the difficulties of their enforcement for many years now, and recently published a Patent Enforcement Index (PEI) which is positively impacting on corporate patent filing management practices, and the decisions of policy makers, around the globe. Here he explains more.

According to the World Intellectual Property Organisation (WIPO) a patent is an exclusive right granted for an invention, which is a product or a process that provides, in general, a new way of doing something, or offers a new technical solution to a problem. In 2019 there were in excess of 3.2 million patent filings worldwide. The company who filed the most applications in 2019 was Huawei who filed over 4,000 applications around the world. Retaining, enforcing and maximizing the returns of the innovation advantage secured through these filings is clearly vital given the huge sums invested in the research, development and administration of these patents.

IN 2019 THERE WERE IN EXCESS OF

3.2m PATENT FILINGS WORLDWIDE

The rights patents provide are territorial, meaning patent applications are only valid in one country, the country where they are filed. If a patent granted in the UK is not filed in another country within two years, then everybody can use the technology as long as they do not sell into the UK. Whilst every company would want each of its patents to be valid in all 193 countries in the world, this would be prohibitively expensive - no company can achieve this. As a result, organisations are required to think strategically about in which countries to file their patents, often a complex decision making process involving assessing the strategic importance of a patent, competitor filing, and importantly how any breach is enforced in the country in which it was filed. Nick realised that throughout the sector there was a reliance on personal opinion or anecdotal evidence surrounding patent enforcement, and that objective data would be very valuable.

NICK BELIEVES THAT CONTRARY TO ANECDOERAL EVIDENCE AND ESTABLISHED ASSUMPTIONS, PEI INDICATES THAT COMPANIES NEED TO CUSTOMIZE THEIR PATENT FILING STRATEGIES IN DIFFERENT COUNTRIES SO THAT THEY CAN MITIGATE RISK AND CONTROL UNCERTAINTY FROM VARIATIONS IN ENFORCEMENT, AND POLICY MAKERS NEED TO CONSIDER THEIR COUNTRIES ENFORCEMENT PERFORMANCE DISTINGUISHING FROM OTHER ASPECTS OF THE PATENT SYSTEM AND DEVELOP SPECIFIC ENFORCEMENT POLICY MAKING ACTIONS.

Creating a PEI
In his research Nick identified three types of the transaction costs a patent owning firm could expect to incur when engaging with and enforcing their rights in a country:

1. Servicing costs – This measures the transaction costs that patent owners face will vary depending on the quality of the patent administration in a country.
2. Property rights protection costs – Measures the effectiveness of the judiciary, police forces, customs officials and other government agencies when undertaking patent enforcement related activities.
3. Monitoring costs – Measures the level of transaction costs that firms face for monitoring infringement by competitors and for constraining opportunistic actions.

Having identified the costs incurred when enforcing a patent breach Nick modeled these costs enabling him to define and map them, leading to the creation of the PEI – the first of its kind. The PEI tells us about the relative volatility and differences of patent enforcement across 51 countries, for the years 1998-2017.

The most important patents are usually strategically filed in 5 to 10 countries. Pharmaceutical patents are sometimes filed in more than 40 countries.

The PEI has become influential with all the stakeholders working throughout the sector, largely thanks to its reliability and impartiality.

1. Patent practitioners can assess trends, evolution and trajectory of patent enforcement strength in a country, thanks to its 20 year coverage. Given patent filing decision making for each patent can last for 20 years, being able to understand these trends is important.
2. PEI allows policy makers to assess their performance across time and also to include the index in their policymaking studies (such studies need reliable longitudinal data). It also helps them understand their performance compared to other countries and whether their level of enforcement strength is good for their economy. (Nick’s academic research shows that patent enforcement can be used to help a country attract FDI.)
3. Legal firms use PEI scores to advise clients on where to file their patents, including convincing foreign clients to file their patents in their country.
4. Nick has assisted a number of global and multinational organisations with their patent planning and filings strategies.

Using the index in practice

Nick believes this accessibility has been critical to its adoption by parties to patent management and policy making at firms, industry and national levels.

Professor Nick Papageorgiadis

Nick’s Patent Enforcement Index is freely available to use at liverpool.ac.uk/management/research/projects/patent-systems/

Academic analysis of the index
As an academic researcher Nick is also fascinated by what PEI tells us about the relative merits of patent enforcement globally. He discovered that the index reveals that the strength of patent enforcement varies significantly between countries and showcases previously uncaptured volatility in enforcement within and between countries. This was not understood before PEI but the theoretical framework of its calculations led to that discovery.

Professor Nick Papageorgiadis

Nick also found that strength of patent enforcement levels have:

1. A U-shaped effect on innovation activity...
2. A positive effect on attracting Chinese and US FDI...
3. A varied effect on the entry mode choice of firms from BRICS countries into Europe...
4. A positive effect on economic growth.

Create a PEI

The Management School is set to launch an Executive Doctorate of Business Administration (DBA) aimed at working professionals.

Starting in January 2022, the Executive DBA takes a practical approach to allow the integration of knowledge and critical thinking skills into work contexts. The programme will enable individuals, in a range of leadership positions, to enhance how they practice management by engaging in an in-depth programme of work-relevant research.

Although equivalent in status to a PhD, the Executive DBA provides a more suitable option for those wishing to develop their professional career rather than pursuing an academic route. The programme will run over a minimum of four and a half years. The first two years consist of four modules focused on the principles and practice of doctoral research, including research methods and research design. Teaching will involve a mix of resident and video conferencing sessions, workshops, and interactions with management professionals. The programme culminates in a 60,000 word thesis.

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Members of AMBA’s accreditation panel, representing senior management at AMBA-accredited Business Schools globally, commended the Management School’s strong connection to industry, especially with companies in the football and horse-racing industries. The panel commented on the range of activities with which corporate partners engage, including curriculum development, research projects, alumni activities, and student scholarships. The panel also noted that there was a strong and collegiate culture at the Management School, with the staff demonstrably engaged with initiatives. The School was seen to be very supportive of its academic faculty. Additionally, the School’s rapid response to the Covid-19 pandemic was commended by the panel.

Welcoming the official accreditation, Management School Dean, Professor Julia Balogun, said: “The University of Liverpool Management School is delighted to be joining the group of globally leading Management Schools carrying the triple crown accreditation of EQUIS, AACSB and AMBA. The AMBA accreditation covers not just the full-time Liverpool MBA Programme, ranked in The Economist WhichMBA top 100 Global Ranking, but also our unique Football Industries and Thoroughbred Horseracing Industries MBAs, supported by our Research Centre in Sports Business.”

The University’s Management School was established in 2002 and has a strong reputation for teaching, research, and student support. AMBA accredits the Liverpool MBA, the Football Industries MBA, and the Thoroughbred Horseracing Industries MBA.

Andrew Main Wilson, Chief Executive of the Association of MBAs and Business Graduates Association (BGA) said: “I am delighted that the University of Liverpool Management School has been accredited by the Association of MBAs. The “School is world renowned for its excellence. AMBA only accredits the top 2% of Business Schools globally and it is therefore fitting that this School has been accredited.

I would like to congratulate everyone at the University on this achievement and I am looking forward to working with the School in the future.”

AMBA accreditation represents the highest standard of achievement in post-graduate business education. Its rigorous assessment criteria ensure that only programmes of high-quality, demonstrating the best standards in teaching, curriculum, and student interaction, receive the AMBA accreditation. AMBA accreditation is international in scope and reach, and AMBA works under the umbrella of 2000+ accredited programmes should be of the highest standard and reflect changing trends and innovation in post-graduate management education.

Its accreditation process reflects this commitment to fostering innovation, and demanding Business Schools perform at the highest level continually.

Upon receiving AMBA accreditation, all current MBA students and recent MBA alumni of The University of Liverpool Management School are strongly encouraged to apply.
LEARNING TO MAKE A DIFFERENCE FROM AN ENTERPRISING AND VIBRANT WORLD CITY OF CULTURE.