



Final Report from
the Expert Group on

Retail Sector Innovation





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Final Report from the Expert Group on Retail Sector Innovation

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Executive summary

Engagement by the European retail sector in innovation is a pre-requisite to the deepening of the Innovation Union. To this end, the European Retail Action Plan established a high-level expert group to recommend possible short- and medium-term priority actions to help increase the sector's competitiveness through innovation.

The increased awareness of the potential of the retail sector to contribute in this way derives from the sector's scale and role: European retailing generated €2.6tn in sales in 2011 from 3.7mn businesses (15% of all European businesses) and €451bn in value added. It employs 18.6mn people: the largest employment sector in the region. Retailing is also the closest sector to the citizen and consumer in the value chain. This not only permits but requires retail firms to achieve effective co-ordination and development of customer-centric innovation.

However, the external perception by many of the retail sector is that firms of all sizes are poor innovators by comparison with other sectors, and are poorly represented in terms of traditional markers of innovation intensity. This perception largely arises because retailers innovate differently. Whilst retail businesses can be product and process innovators, as well as engaging successfully with both technological and non-technological innovation, many larger retail firms are also marketing, organizational and open innovators, as they seek to co-ordinate not just product and process innovation, but innovation in their value propositions across the value networks in which they operate. The nature of competitive retail markets means that retail firms often exhibit more incremental than radical innovation practices.

The geographical and enterprise structure of the retail sector are also important considerations in understanding differential propensity to innovate. Some European markets are at different stages in their retail development. And whilst the European retail sector is the largest private economic sector within the EU28 in terms of enterprises and employment, it is still highly fragmented, with integrated national chains only accounting for 0.1% of all enterprises, although 45% of the sector's value added. The sector is intensely entrepreneurial, with over 5.3mn self-employed individuals engaged in retailing. The customer-centric nature of retail innovation demands that the process is not just about incrementally improving efficiency in the sector but is also concerned with achieving greater effectiveness in the customer's experience of the retail offer. Retail innovation is as much an art as a science. At its heart, retail innovation will only be successful if it can substantially increase customers' quality of life throughout the shopping experience.

The future trajectory of innovation within the retail sector is influenced by a number of external and internal drivers of change. The first, and by far the most important, external driver of innovation is the consumer. European consumers are exhibiting several components of change that, in combination, are creating new opportunities for firms. Highly competitive and challenging economic conditions stimulate the development of innovations that lead to cost efficiency, low prices and a higher level of consumer welfare in both the short- and long-run. Digital technologies are acting as transformational drivers of the sector, with consumers at their heart. Regulatory drivers serve to shape the sector's scale, growth and characteristics, but also influence the kinds of innovations that can be profitably brought forward. Within the sector, organizational drivers stimulate the development of a culture supportive of creativity, and a lean, flexible organizational structure within which such ideas can be implemented. Finally, the broader value networks within which retailers

operate are allowing the larger retailers to play the role of an ‘innovation hub’ pulling together partners’ expertise and allowing them to share the risk and cost of innovation.

We identify five barriers to innovation of particular significance to the retail sector: a lack of awareness (both amongst retailers of the existence of and ways of participating in existing EU innovation initiatives, as well as the relative lack of visibility of the sector’s contribution amongst policymakers and society), costs (meaning that it can be hard to secure the finance required to support radical innovation projects given the tight margins within which even the largest firms operate), availability of human resources (notably the scarcity of appropriately skilled labour), risks (particularly for retail SMEs) and regulatory constraints (notably those that presently hinder the completion of the Single Market for services).

Our recommendations are narrowly retail innovation-specific. They are generated from a clearer understanding of the characteristics of the phenomenon within retailing and are made not just to the Commission, but to other stakeholders - who have the capacity to influence the future nature, pace and incidence of innovation within European retail firms.

Four recommendations seek to **build better awareness** amongst policymakers of the potential contribution of retail innovation to competitiveness, as well as encouraging the development of mechanisms that might help retail firms identify specific opportunities to engage in innovation. These include ways of stimulating greater policymaker engagement with the sector, the auditing of existing initiatives, platforms and programmes, the encouragement of sector participation in European Technology Platforms, and ways of proactively identifying and prioritizing areas of relevance to the sector where harmonization of standards would enhance European retail innovation capability.

Six recommendations are designed to **prompt greater participation by retail firms of all sizes and sectors in European innovation funding and projects**. These include ensuring calls for the Horizon 2020 programme are more relevant to the needs and interest of the sector (including consideration of the funding formulae) and the development of a network of retail laboratories. There is particular consideration given here to the specific needs of retail SMEs, including ways of delivering greater awareness of COSME funding and facilitation, a proposed fast-track route to funding, and asking the existing SME Helpdesk (Your Europe – Business) to make provision for retail SMEs which, after all, make up 20% of all European SMEs.

Four recommendations work to identify, stimulate and support relevant **investment in retail skills and education** that will increase the potential for innovation and growth in the sector. Here, the Group encourages the work of the Committee for Retail Sector Social Dialogue and the recently established EU Retail Sectoral Skills Council places a priority on co-ordination of support for innovation-related skills training and recruitment activity.¹ It urges the development of ways of exposing senior retail managers to customer-centric innovation through mechanisms such as design thinking and encourages universities, research institutes and member state research councils to engage in more innovation-relevant knowledge exchange activity. In addition, it proposes the establishment of more widespread R&D voucher schemes and support for social networks for information sharing amongst retail SMEs in respect of innovation.

¹ To be consulted with social partners

Finally, three recommendations in relation to regulatory issues seek to ensure that policymakers **use a 'retail reflex' in their thinking**. This is in particular recognition of the fact that innovation in retailing spans firms, geographies and value chains - including consumers - and that unforeseen consequences can arise from the design of other policies and regulations in respect of their effects on the capacity for retail innovation.

1. Introduction and objectives

In its report on the state of the Innovation Union for 2012, the Commission expressed its desire to take steps to *deepen* the Union, based on emerging trends, expert advice and the view of stakeholders and noting the increased fragmentation of value chains. One of the ways in which this is to be achieved is through greater understanding of and involvement with the retail & wholesale sectors: *“helping smooth the path from idea to market for innovative products and services by tapping the potential of the retail sector with its economic weight ... and direct contact with consumers.”*¹ To this end, the European Retail Action Plan (ERAP) called for the launch of a retail innovation initiative whereby:

“... the Commission, with the help of high-level experts, will explore how to ensure that the retail sector can contribute to, and benefit from, innovative products, services and technologies.”

On that basis, the Commission would design:

*“... concrete actions focused on boosting retail competitiveness, such as bringing research results to the market faster, integrating e-commerce and brick-and-mortar environments, new ways of informing consumers about products, the development of innovation-friendly regulations and standards, etc.”*²

As a result, an Expert Group on retail sector innovation was established in 2013 to recommend possible short- and medium-term priority actions to help increase the sector’s competitiveness through innovation. The full terms of reference for the Expert Group and details on its membership and activities can be found in Appendix 1 and [here](#)³.

Despite the laudable aspirations of the Innovation Union and the European Retail Action Plan, the contribution of the retail sector to European innovation and competitiveness is still relatively poorly understood and accommodated by those responsible for developing policy and administrative processes in relation to support for innovation, and by those drafting regulations elsewhere that may affect retail firms’ propensity to innovate. Retailers are still too often regarded as simple intermediaries providing non-tradable services that create little added value. The 242-page 2011 European Competitiveness Report, despite focusing upon the importance of innovation in economic recovery, and the contribution of tradable services such as KIBS,ⁱⁱ made no mention of the retail sector whatsoever⁴. In the 2012 Report, the discussion of retailing was limited to opportunities for foreign direct investment⁵. Retailers are traditionally thought of as poor innovators⁶, although there are few if any statistics to support this assertion – in part because the measurement of retail sector innovation in the Community Innovation Survey is optional for member states, but also because retailers tend to innovate differently than either conventional R&D-led manufacturers or pure service firms, which make their contributions harder to measure.

The reality is that the retail sector is a significant contributor to the European economy and society. Retailing created added value of €451bn, 7.9 % of the non-financial business economy, in 2010. It is the largest private employer within the EU28 in terms of the number of persons employed (18.7 million), employing more people than in construction and three times as many people as in financial services, or in information & communication activities. It is also the sector with the most firms: 3.6 million businesses. Although, this includes some of the largest companies in Europe, the vast majority (over 95%) are SMEs. In terms of value added per worker, domestic retailers in the EU12 were 12% more productive than those in the EU12 manufacturing sector in 2008^{iv}.

Retailing is the closest sector to the European citizen and consumer in the value chain. This has two implications. First, retailers are better placed than are other sectors to gather insight into the behaviour of consumers. Secondly, as a consequence, the retail sector is in a better position to co-ordinate and develop innovative strategies within European markets. This can be seen in the way

ⁱⁱ KIBS – Knowledge Intensive Based Services

that an increasing number of retailers are thinking differently about the way in which their business works, the roles and responsibilities of their managers and employees, and the competitive value that their company provides. The best retailers recognize the limitations inherent in their business models and the weakness of traditional, linear thinking, and take a broader perspective, which requires continually re-assessing the value proposition in order to offer consumers a better quality of life.

Nevertheless, many European retailers remain unaware of, or reluctant to engage with, the Commission's various platforms and programmes on innovation. For example, estimates from those member states reporting suggest that there was a gap of around 40-50% in the use of public funding for innovation between retailing and manufacturing (52%) and between retailing and the economy as a whole (40%) in 2004⁷. Why should this be, given the particular need that the sector has to innovate in order to remain competitive and attractive to its customers?

This report details the high-level analysis and recommendations of the Group. Following this introduction, the report spells out the scale and characteristics of innovation in retailing, discusses pinpoint the drivers of innovation and the barriers inhibiting retail firms, before presenting a series of recommendations designed to be of relevance not only to policymakers, but also to other stakeholders. A series of appendices attached to the report develop in more detail six selected themes that the Expert Group considered required greater attention. The summary analysis in this report should be read alongside these more detailed appreciations.

There is no single 'silver bullet' to fully address the issues we have identified. Our work has nevertheless been driven by a vision: that of **a European retail sector that is fully recognized for its existing contribution to innovation & competitiveness and which, in turn, plays a full, integrative part in the Innovation Union**. This requires the gap that presently exists between the sector's existing capabilities and the ways in which the Commission and other stakeholders seek to bring forward innovative products, services and technologies to be reduced, in order to more fully realize retailing's capacity to contribute to growth and competitiveness in Europe. Our recommendations are designed to this end.

2. Retailing and innovation: making the case

Retailing is a highly competitive sector of the European economy, by its very nature. Consumers are the ultimate arbiters of firms' ability to identify and predict market trends, and to procure and distribute products and services that represent desired customer value, at the right price and through the right channels. Firms must strive with each other to better align themselves to consumers' continually evolving needs and expectations of value, in order to retain their business. No firm is too big to fail in this endeavour and, during the recent economic crisis, many have done. And yet, amongst the drivers acting on the sector are those working to still further increase consumer power. As a result, the ability to innovate successfully to create customer-centric differentiation is critical to the overall success of the sector and increasingly decisive in the survival of individual firms.

However, the external perception by many of the retail sector is that firms of all sizes are poor innovators by comparison with other sectors of the economy, such as Engineering or Pharmaceuticals. The most recent EU R&D Scoreboard, which examined the innovation performance of 1,000 companies in Europe and a similar number elsewhere between 2002-11, classified general retailers as having 'medium' to 'medium-low' innovation intensity⁸. There were only 27 retail firms in the top 1000 European firms ranked by industrial R&D spend in 2011, comprising less than 1.4% of total European spend. Such rankings are beset by errors and omissions outside conventional R&D sectors. For example, misallocations in 2012 led to a nuclear reprocessing firm and an Italian freight vehicle manufacturer being classified as 'retailers'. The retail sector is also significantly under-represented in terms both of patents and trademarks, traditional markers of innovation intensity. How do we resolve this apparent paradox: of an inherently dynamic and competitive business sector, which nevertheless apparently underperforms in respect of conventional tests of innovativeness?

The nature of retail innovation

The paradox arises in part because retailers innovate differently. European governments, academics and policymakers have recently become increasingly interested in the importance of innovation in the service sector more generally, not least because of the sheer size of the sector in terms of enterprises and its potential for job creation and economic growth. This has led to a re-focusing of research and policy attention, in particular, on the non-technological aspects of innovation that are held to characterize services, alongside the technological innovations to occur in the sector.⁹

However, whilst retailers are indeed service businesses, many retailers are, or have become, essentially hybrid innovators and the sector shares a distinctively different approach and mix of characteristics in relation to innovation¹⁰. In summary, retail firms are able to engage in innovation behaviours that are characteristic of both production and service sectors. Retail businesses can be product and process innovators as well as engaging successfully with both technological and non-technological innovation. Many larger retail firms are also open innovators, as they seek to coordinate both product and process innovation across the value chain. However, the nature of competitive retail markets means that retail firms often exhibit more incremental than radical innovation practices. We explore and illustrate some of these distinctive characteristics, below.

- Retailers are both product and process innovators. As some retail firms have become larger in relation to their supplier base, national multiple retail chains and large-scale retail formats have emerged, with more significant market shares. These firms have sought to develop more innovative, dedicated and efficient distribution systems and integrated supply chain capabilities, in the search for operational efficiency and in order to better meet customers' needs. Examples

include sustainable logistics, self-checkout operations and click-and-collect systems. At the same time, many retail firms have become brands in their own right and have engaged in product and service innovation through, for example, the development of own brand, as a means of sustaining their differentiation from competitor firms (see Annexe, theme 4, and Case study 1, Isfi Spices). Own brands are innovation leaders in some market segments (such as toilet paper and) and retailers argue that consumers would not have access to some niche products if not for their innovative activity, in addition to the greater variety that own brand innovation brings to the European market.

- Retailers are open innovators. This means retailers use external as well as internal ideas, and internal and external paths to market, as they look to advance their technology or innovate with partners by sharing risk and sharing reward (Chesbrough 2003). The development and application of scanning systems and associated technology has provided the necessary information for many retail supply chains to be reversed from a 'producer push' to a 'consumer pull' approach, placing some retailers – closer to the consumer than others in the value chain – in a position where they are more easily able to discern opportunities through more effective insights into consumer behaviour. Such retailers then have the capability of becoming 'innovation hubs', co-ordinating and broadening innovation across a range of supply chain members. Retailers can co-create value with supplier firms, or with consumers, downstream. Examples include the long-term relationships fostered through own brand development (often providing supplier SMEs with new routes to market), the creation of customer information systems shared with suppliers (such as Walmart's Retail Link database), or the development of mobile commerce apps based on engagement with consumers. Ultimately, some retailers have become vertically integrated, exhibiting a 'manufacturing' approach to product innovation.
- Retailers engage in both technological and non-technological innovation. Whilst significant, sector-wide investments in innovative technology systems, such as self-scanning, loyalty marketing systems, mobile web platforms or new payment methods, continue to transform the customer's experience and the efficiency of retail businesses (Annexe, Theme 6), non-technological innovation in the store or online experience (for example, through the introduction of new merchandising techniques, new marketing approaches or new business models and formats) have perhaps had even greater influence upon consumers' behaviour in the long run. New business models are a particular effective way for retailers to differentiate their value proposition for their customers. Successful leading adopters of new formats can see their efforts generate sector-wide transformation: the growth of generic formats such as hypermarkets, convenience stores and deep category speciality fascias all have their origins in the innovative practice of individual firms, and are good contemporary illustrations of the ways in which specific organizational innovations can become sectoral norms (Annexe, Theme 3 and Case study 4).
- Retailers tend to innovate incrementally rather than radically. Sometimes apparently small innovations can deliver significant outcome for retail firms. The development of shelf-ready packaging, the movement of a barcode (see Case 2) or continuous strategies to reduce wastage, can become substantial in their effects over time. Retailing also trades in markets characterized by their 'low appropriability': that is, many business practices and processes are more open to emulation by competitors, in part because of their very transparency. This can often cause innovating retailers to work differently: perhaps starting small, or working incrementally, before rapidly scaling up hitherto hidden innovative activities. The risks of easy emulation may also discourage retailers from sharing innovative ideas at an early stage with others, particularly when many of the kinds of innovations in which firms engage are incapable of being fully protected in terms of IP legislation or patent law because of their lack of

formality. Starting small also minimizes risks and other costs. However, retailers can experience a reverse innovation cycle, where – unlike in manufacturing – financial and organizational costs attached to innovation are low at the beginning and high at the end, when a successful innovation must be rolled out across an extended network of stores.

Structural aspects of retail sector innovation

Our analysis makes it abundantly clear that the retail sector innovates differently. It is therefore hardly surprising that statistical surveys and analyses simply aimed at quantifying levels of innovation from the point of view of industrial R&D, patents or licensing are generally poorly equipped to effectively represent the sector's performance in this respect on the European stage.

Added to this, the geographical and enterprise structure of the retail sector are also both important considerations in understanding its propensity and potential to innovate. Geographical differences in the scale and nature of retail innovation appear to be pronounced. Earlier research suggests “*[retail] companies in Northern Europe are more involved in intramural R&D than companies in Eastern & Southern Europe*” (INNOVA, 2011). Part of the explanation for these variations lies in the fact that these markets are at a different stage in their retail development and may seek different kinds and levels of support and engagement from other stakeholders, including the Commission. Interestingly, the same research suggests that retail companies in Southern Europe receive a relatively higher amount of public funding support for innovation than elsewhere in the region.

Structural differences in terms of enterprise composition are also major considerations in evaluating the retail sector's innovation potential. Whilst the European retail sector is the largest private economic sector within the EU27, in terms of enterprises and employment, it is still highly fragmented despite the growth of integrated national chains. Such large retail chains only account for 0.1% of all enterprises, although over 45% of value added and 36% of employment within the region. Much of the intramural R&D that takes place in the sector occurs within these larger chains because of their relatively greater access to financial and human resources and their need to have recourse to continuous innovation to maintain their competitiveness at a larger scale. However, more than 95% of retail enterprises are microbusinesses, employing no more than 2 persons on average. And there are over 5.2mn self-employed individuals engaged in retailing across Europe. This situation presents both challenge and opportunity.

Raising the potential for retail SMEs to be more closely engaged in innovation has been a particular concern of the Expert Group. The 10 principles enshrined in the Small Business Act for Europe, in which both innovation and entrepreneurship appear, should be seen to apply to retailingⁱⁱⁱ. As the report makes clear later, there are both drivers and obstacles related to innovation with particular resonance for small retail firms. Nevertheless, the relatively low barriers to entry that retailing provides means that it can be a vital source of entrepreneurship within the service sector more broadly, and retail start-ups make up a significant proportion of all start-ups across Europe. By definition, entrepreneurs “are successful because their passion for an outcome leads them to organize available resources in new and more valuable ways”¹¹. Whilst not all retail owner-managers could be classed as entrepreneurs, the high costs of conventional innovation, when combined with low margins and fewer resources for training than for larger firms, may make it difficult for entrepreneurial retail SMEs to participate in conversations about innovation, or to engage with Commission initiatives other than by means of trade associations or through other representative groups. Nevertheless, the advent of the Internet (giving low cost access to

ⁱⁱⁱ The ten principles are: (1) Entrepreneurship, (2) Second chance, (3) Think small first, (4) Responsive administration, (5) State aid and public procurement, (6) Access to finance, (7) Single market, (8) Skills and innovation, (9) Environment, and (10) Internationalization. (Source: SME Performance Review, European Commission, <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/>)

information systems) and of the technologies associated with non-store retailing through fixed and mobile channels means that small retail start-ups are now, in principle at least, less affected by the physical constraints of trading locally, and that a more level playing field exists for potentially innovative cross-border activity. (See Case 3).

Creativity and the process of retail innovation

The customer-centric nature of retail innovation demands that the process is not just about incrementally improving efficiency in the sector but is also concerned with achieving greater effectiveness in the customer's experience of the retail offer. As a result, the 'science' of retail innovation has to be complemented by the 'art' practiced within the innovation process itself, not least by those who lead that process. Retail innovation is as much an exercise of creativity within the shopping process or the retail job as it is of scientific management. It is not a one-shot act, and is not so much about detecting best practices but about creating what we might refer to as "next practices".

At its heart, retail innovation will only be successful if it can substantially increase customers' quality of life throughout the shopping experience (including pre- and post-purchase experience). Only by doing so will a retail firm benefit from continued customer preference. Whilst much innovation within the sector is naturally focused on increasing efficiency, boosting productivity and the speeding up of administrative processes, the most effective kind of retail innovation occurs when there is a re-engineering of the shopping process in a more holistic and radical way. This can be seen most clearly in the development of a totally new retail concept (see case study 5).

The creative process requires first and foremost a clear empathy with the lifestyles and expectations of a firm's customers. It must also be able to draw upon on a wide range of technologies and novel disciplinary approaches. For example, some retailers are increasingly employing a design thinking approach to the innovation process^{iv}. Such approaches are most successfully developed within small teams and – most importantly – always have clear and distinctive leadership¹². The requirement for effective leadership of the retail innovation process, through the engagement and support of senior managers, is crucial to its success. However, ensuring retail innovation is within the mindset of top managers is not always possible through traditional education: the training and development process must itself be transformative. (See Annexe, theme 1 for a fuller explanation of this issue.)

^{iv} Design thinking involves a combination of empathy for the setting of a problem, creativity in how insights or solutions can be developed and rationality in analysis and operationalization. See Martin, R.L. (2009).

Case study 1: Isfi Spices, Belgium.

Product innovation – open innovation

Isfi Spices is a small Belgian company, founded in 1983 (<http://www.isfi-spices.be/>). It has become an innovation leader in the selection, blending and packaging of herbs and spices for own brand development through its long-term collaboration with METRO Cash & Carry Belgium and subsequently with Delhaize and other major retailers. Founded in 1983, Isfi employs 70 people and generates a turnover of Euro 28mn, 22 % of which is exported.

Isfi has benefited significantly from open innovation with METRO Cash & Carry Belgium. Both companies work together very closely to develop new products and mixtures. It takes Isfi just 3-4 weeks to develop and introduce an innovation and a new product – for a larger company the same process would take at least 6 months. Innovation takes place in products, packaging, as well as in new mixtures and solutions for consumers, such as: gastronomic spice mixes, dessert mixes and herbs in sunflower oil.

The long-term relationship with METRO had a significant impact on Isfi's success and its export numbers: Today Isfi produces about 350 different articles for METRO Belgium and METRO France generating a turnover of 3.5 Mio Euro. Isfi is also producing for other major retail companies like Colruyt, Delhaize, Carrefour, Lidl and Spar. With Delhaize Isfi developed a special retail concept, which all together offers 260 new SKUs to the customer. Specific innovations include: smaller sizes and single use mixes for single households and square boxes – which are more efficient for display. By switching to this concept Delhaize increased from 450.000 Euro to 4.5 Mio Euro in 3.5 years, the products are available at 620 stores in Belgium.

The advantages to the SME of innovating in this way are significant. Isfi does not need to invest in marketing to create its own leading manufacturer brand. The investment focus can be on the innovation development, it is easier to follow and implement trends - the retailer then does the branding and marketing. Innovation is based on a long-term partnership with the retail companies. A minimum contract duration is 1-1.5 years. Consumers benefit therefore from: more choice, better prices and a high degree of innovation. For example, the major manufacturer in this sector had a similar 'herbs in sunflower oil' product, which was 50% more expensive. The result was that the manufacturer had to decrease their price, to the benefit of consumers.

Case study 2: Barcode relocation

Process innovation – incremental innovation

Employees as well as customers are a powerful source of co-created innovation in many retail firms. And in retailing, attention to detail can mean that the impact from a small incremental innovation could be substantial for large firms. Checkout staff in a large European grocery retailer raised the issue of the difficulty of scanning some barcodes located in awkward locations on certain types of packaging. The retailer worked with the packaging companies concerned and the barcode locations were changed. It was calculated that the 1 second saved per transaction delivered the equivalent of €3mn per day cost savings across the business.

Source: Retailer

Case study 3: Munich Sports, Spain.

Technological innovation – open innovation

Munich Sports, founded as a sports shoe manufacturer in NE Spain in 1939 by Luís Berneda is now a thriving sporting equipment manufacturer and e-commerce retailer. The firm made the decision in 1999 to move into the streetwear fashion market and launched its own website in 2009 called *Munich My Way* (<https://www.munichmyway.com/>). The distinctive feature of the site lies in the ability of the customer to completely personalize their shoe design, choosing preferred textures and colours. A total of over 300mn variants are currently possible. Once payment is made, the shoes are manufactured to order and dispatched within 2 weeks. The capability for personalization is strongly appreciated by customers, who are willing to pay between Euro 100-200 per item.

Whilst the company sells direct locally and supplies more generic ranges to Spanish footwear stores, much of the company's innovation lies in their aggregation, analysis and use of customer information derived from online sales. This allows them to develop a much clearer understanding of international differences in footwear type, colour and design and a better ability to target particular designs of shoe to established retailers in other European markets. (Image source: Munich, 2013)

Case study 4: Vente Privee, France

Business model innovation – radical innovation

Brand manufacturers and retailers often have inventory overstocks that require discounting and disposal. The Internet has provided an opportunity for the development of an innovative business model for fashion products: the online, limited life, sales event. There are several retail businesses operating in this marketplace, including Overstock.com (US) and Privalia (Spain), but Vente Privee is Europe's leading online seller of fashion overstocks. The business was established in 2001 in France as an entrepreneurial start-up and is still owned and managed by its founders. It now operates in Germany, Spain, Italy, UK, Belgium, Austria, the Netherlands and, with Amex, the US.

Building on the structural gap in the market for the disposal of overstocks, the business organizes online sales. 48 hours before a sale takes place, an invitation email is sent to all members. Sales usually start at 6 am GMT weekdays, and 8 am weekends, and last for 3 to 5 days. The marketplace has 18m members in Europe, organized 6,100 flash sales and sold more than 60m items in 2012. Vente privee made estimated revenues 2012 of £1.3bn (+22%) and has been profitable since 2003.

3. Drivers

The future trajectory of innovation within the retail sector is influenced by a number of external and internal drivers of change. In this report we have identified five important drivers as the nodes of change. In combination, these create significant opportunities – and in some cases requirements – for retail firms which want to continue to trade profitably and successfully.

External

Consumer drivers

It is no accident that the first, and most important, external driver of retail innovation is the consumer. European consumers are exhibiting several components of change that, in combination, are creating new opportunities for firms (Figure 1). The European population is ageing, and more mature households will become the largest and fastest-growing pool of consumers, dictating both a change in the consumption basket as well as in terms of the value proposition that retailers will need to offer. The consumer market within Europe will also have more educated citizens entering the labour market later than today. Household sizes will generally be smaller, and consumers will be more urbanized (European Commission 2007). Consumers will also behave with more frugality, perhaps using mobile Internet (European Commission 2013) in order to compare prices, seeking value for money, rightsizing their purchases and minimizing overspending, while still looking for simple pleasures. At the same time we will face consumer groups that increasingly honour the local and value the importance of community; participating in socially responsible movements and seeking more responsible companies, brands, products, actions, and greater fairness. Finally, European consumers will be increasingly demanding when it comes to information and transparency, as well as in terms of convenience: seeking out 24-hour availability, hi-tech services, digital stores and intelligent shopping support systems.

Meeting these combined pressures will be no easy task for retail firms. These are all conditions that will intensify the drive to retail sector innovation, the main aim of which is to substantially improve customers' quality of life in their shopping process, reducing the efforts that they will need to make. An increasingly customer-centric approach will aim to satisfy a market that is expecting value, convenience and well being and demanding social responsibility, seamless omnichannel service, transparency and honesty. This changing consumer market will also drive innovation in relation to new packaging, new products and services, novel business models, and eco-innovation.

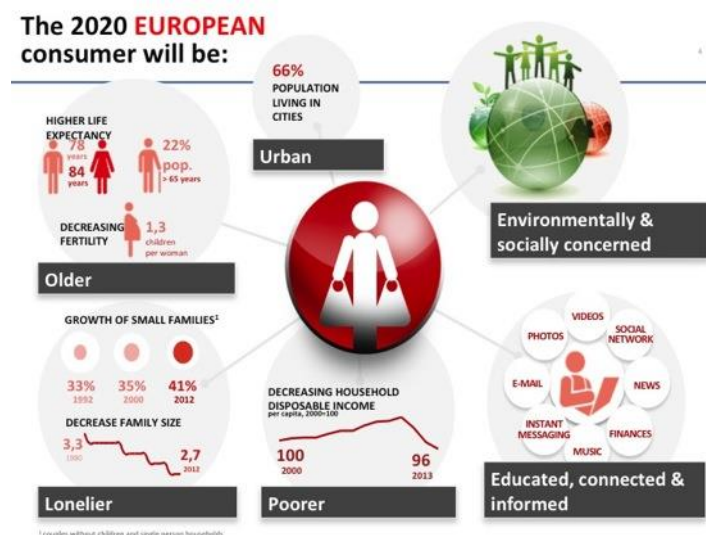


Figure 1: The 2020 European consumer

Economic drivers

Competition has always been an essential feature of the retail sector. Highly competitive conditions stimulate the development of innovations that lead to cost efficiency, low prices and a higher level of consumer welfare in both the short- and long-run. The economic crisis has provided an added incentive for retail firms to innovate. Conventional competitive pressures affect the pace of innovation and result in greater customer value, make it easier for customers to switch provider, leading to a more transparent market and more informed purchasing decisions. The precise mix of what customers want varies over time and is different in different European markets. But it's always more than just price. Non-price factors, including range and product availability are often the most important motives for customers to switch. Other drivers to switch are quality, store atmosphere, cleanliness, queues and staff helpfulness.

Fear of industry disruption is another important competitive driver. Retail innovation is rarely under the control of a single operator in the supply chain. Operators in supply chains integrate more and share risks in developing new processes or products. The barriers to entry into retailing are very low when compared to other sectors, meaning that new entrants are able to quickly develop innovative value propositions that can disrupt existing business models. Nowhere more so can this be seen than in the dynamic growth of pure play e-commerce businesses across Europe in the last 10 years. Increasingly, customers are often involved in the innovation process as well. Besides cooperation with other companies or other parties, an open innovation approach can involve the assistance of customers in the design of new products and services. In this way, customers are actively involved in co-creating value in the supply chain. Other economic drivers that serve to boost innovation include more efficient purchasing processes within firms, and a balanced cost of labour.

Case study 5: Victorio & Lucchino Men, Spain

The case of Victorio & Lucchino (V&L) is a good example of customer-centric retail innovation, with its objective of reducing the amount of effort required by the customer. Victoria & Lucchino is a ready-to-wear Spanish retail fashion brand, founded in the 1970s (www.victoriolucchino.com). A new concept shop, V&L Men, was created, with a retail formula based on the understanding of the "not very passionate" relationship between most men and fashion.

Qualitative market research indicated that some (Spanish) men felt that shopping for apparel was a time consuming activity, as well as a source of feelings of ignorance and doubt about appropriate colours and texture combinations. Men also hated to try on garments in the fitting room. The V&L retail concept was devised specifically to provide men with a new shopping process able to substantially reduce those efforts, while also reflecting the values of the V&L brand. The new store was themed as a living room, expressed with the particular imagination, style and liveliness of the two Sevillian designers. The shop maximizes customer convenience by mass-customising the shopping process while reducing substantially customer efforts in a fun way. First 'pinpoint profiling', allows a customer to receive a free diagnosis of their aesthetic preferences. Customers can discover, with the help of a touch screen and a stylist, which style fits the most with their personal taste. The second step is the "Canvas", a 40-inch touch table-tablet that suggests three coordinated outfits which take into account these preferences.

(Source: Martinez-Ribes & Amaral, 2013)

Technological drivers

The advent of new technology systems, particularly of network-based technologies, is amongst the most visible driver of change in the retail sector. Digital technologies are recognised internationally as transformational drivers of economic growth, when effectively implemented (European Commission, 2006). For organizations of all kinds, not least for retailers, this growth can be achieved in two broad ways, through doing new and better things (for example, by developing products and services which are either wholly innovative, or which are more effective substitutes for existing products and services or essentially non-digital value chains), or by doing things better (applying efficiency improvements to existing tasks and processes for both organizations and end users).

Consumers are, again, at the heart of these systems and, therefore, these smarter and interconnected technologies are very much influenced by the increasing role of the consumer in their adoption and use. Consumers increasingly expect retailers to provide shopping processes that are continuously available, increasingly transparent, and which demand more personalisation and customisation.

Some technological drivers can fundamentally affect competition, being capable of disrupting business models, labour markets, consumer behaviour, consumer privacy, and global development. Such technologies change the rules of the game. We have already witnessed the increasing role and importance of online retailing as a complement of traditional store retailing and the subsequent development of omni-channel retailing (through the development of cross-channel mechanisms such as click and collect, purchase online in an offline store etc.). Whilst across Europe online retailing comprises only some 5.3% of retail sales, penetration is already as high as 10.3% in the UK (Euromonitor estimates, 2013). Amongst the array of digital technologies of most recent relevance to the retail sector, the rapid penetration of smartphones and tablet devices provide further stimulus for innovation. Mobile Internet increases information - not least price - transparency for products and services, boosts personal productivity, creates opportunities for continuous shopping, and enhances competitive pressures between retail firms. For example, the development of the mobile Internet has led to many consumers engaging in 'showrooming' behaviour: using their mobile devices to compare prices online whilst benefiting from the service and availability of products in store. European m-commerce is estimated at €17bn in 2012 (Ecommerce Europe, 2013).

Technology systems also play a major role in respect of inter-firm retail functions and many "intelligent technologies" (e.g. RFID, NFC, 3D-printers, and mobile payments etc.) have emerged during the past few years supporting a number of retail functions. For example, technologies that support business analytics can generate business intelligence and create new value by establishing the appropriate infrastructure to obtain the right amount of data, and can help to model future scenarios more accurately. This involves mobile and social analytics (based on the use of crowdsourced big data) enabling retailers to analyse consumer patterns in the relevant channels. Using the right big data technologies and the right knowledge gathering techniques (data mining) to provide the right answers in a timely manner is becoming a critical success factor for retailers. Finally, the innovative technologies involved in B2B marketplaces have been an excellent medium for bringing retailers and suppliers together, to improve both efficiency in relation to purchasing and sourcing products, as well as openness and transparency. The creation of the closer and more creative partnerships between firms involved that result are striking examples of open innovation at work. (See case 1.)

Regulatory drivers

Changes in regulations that directly, or indirectly, affect the retail sector will serve to shape not only the sector's scale, growth and characteristics, but also influence the kinds of innovations that may be brought forward. For example, planning regulations unsympathetic to retail development peripheral to urban areas leads to firms developing innovative small store business models in the centres of towns and cities; full implementation of and compliance with the Service Directive would stimulate more innovative forms cross-border trading by retail SMEs. Regulations should be designed in order to achieve better balance and harmony in the retail market. The argument for deepening regulations in this way is that it ensures innovation to be more service- and retailer-friendly. Another important task for regulatory work is to ensure changes in existing regulations enable retail innovation, thus stimulating a beneficial environment for retail innovation. The retail sector is not a separate actor but is closely connected to producers, distributors and society as a whole. Many regulatory changes will therefore inevitably indirectly affect the sector.

Internal

Organizational drivers

For retail innovation to be successful, it must be extensively supported by organizational processes and by the environment within the organization. This includes effective information sharing within the retail firm, the development of a culture that supports creativity and new ideas, and a lean, flexible organizational structure within which such ideas can be implemented. Another important organizational driver is the willingness to invest in technology systems as they improve store operations, logistics and supply chain, marketing and merchandising, business analytics and intra-firm business-to-business marketplaces. Developing appropriate levels of strategic, organisational, and technological skills can also increase the innovation capacity of a retailer. Over a fifth of European retail & wholesale firms employed IT specialists in 2012. In France alone, some 10,000 new jobs were created in e-commerce in 2012, almost as many as in aerospace¹³. Ecommerce Europe estimates that 2mn jobs can be directly or indirectly attributed to e-commerce across Europe.

Senior management have a profound impact on shaping the firm's strategy and organisation. Therefore education targeting senior managers can strongly influence the innovation capacity of a retail firm. As outlined before, technology plays an important role on both ends of the retail activity. Developing competencies that help to identify opportunities from existing technology can serve as a basis for innovation.

The broader organizational environment within which retailers operate includes networks, partnerships and supplier relationships that might serve as an 'innovation pool'. Therefore co-operations are formed to develop a new solution with joint forces. Complementary resources can be used to create new value for customers or for business partners. Retailers can learn new skills, competencies from and with their partners including suppliers, service providers, and consumers. Collaboration with suppliers and partners from different sectors can be the outset of new innovations too. Here, large retailers often play the role of an innovation hub connecting suppliers, IT, telecommunication firms, and market research companies to work on more radical innovations to pull together the necessary expertise and share the risk and cost of innovation¹⁴.

Case study 6: The Innovative Retail Laboratory, Germany.

It is often hard for customers and firms to perceive the possibilities that open innovation makes available. One environment in which exploration of retail innovation is possible takes the form of a retailing laboratory, an environment based on applied retailing research, which engages multidisciplinary researchers and retail actors. In retail labs prototyping, testing, demonstrating, piloting, validation and market replication take place, which have direct relevance for innovation in the retail sector. Labs break down traditional boundaries between businesses and firms, or retail businesses and customers, and allows intellectual property, ideas, and people to flow freely both into and out of an organization. This can nurture new supplier and partner relationships, promote innovative ecosystems, and generate high-margin licensing income.

A typical example of a successful retail lab is that of Dr. Ralf Jung at Saarland University. The Innovative Retail Laboratory (IRL) builds on an initial collaboration between German retailer Globus and the German Research Centre for Artificial Intelligence. 15 partners and 12 scientists work on demonstrator projects for the food retail industry in the field of intelligent customer assistance systems: ranging from smart shopping trolleys to a digital sommelier and from a mobile product magnifier to an intelligent cheese counter (<http://www.innovative-retail.de>).

Case study 7: The virtual fashion mirror: CISCO StyleMe, UK

Technological innovation – Process innovation

The development of interactive mirror technology in store-based apparel retailing provides an excellent demonstration of how the value created for the customer and the selling process can be modified through judicious innovation. It can be a system-wide change that has an impact on the supply chain and customer side. There are several competing technologies in existence and the example here is drawn from a prototype developed by Cisco for the UK John Lewis Partnership and several other UK retailers. The life-sized mirror seeks to overlay the customer's image with pictures of clothing selected using a gesture-based interface. It enabled shoppers to quickly create outfits by mixing and matching a wide range of garments uploaded into the mirror. The mirror also provided customers with expert recommendations for garments that complemented the one they had selected; by allowing customers to take pictures of themselves trying on garments virtually; and by creating a list of their selected garments. Their lists and pictures could then be printed, sent to them via email, or shared via social media. Over 1,400 customers used StyleMe during the trial period - an average of more than 40 customers daily. 67% of customers rated the experience positively.

Source: www.cisco.com, 2012.

4. Barriers

If the scale and nature of innovation are different between retailing and sectors, should we expect some of the barriers to innovation to be different as well? This report identifies five barriers of particular significance to the retail sector: awareness, availability of resources, costs, risks and regulatory constraints. These barriers are, in general, common to all businesses within the sector, although it is clear that retail SMEs suffer from particular challenges. These range from financial considerations (including poor capitalisation and liquidity problems), to a lack of marketing skills (including a lack of commercial skills to exploit a technological innovation), and the particular management and personal characteristics that are found amongst owner-managers working in the sector (including low levels of trust and a high aversion to risk)¹⁵.

Awareness

An important barrier to accelerating the pace of innovation within the sector is the lack of awareness amongst retailers of the existence of and ways of participating in existing EU initiatives designed to stimulate this (e.g. Horizon 2020 and COSME and those developed by other stakeholders). Awareness works both ways, however. There is an equally strong need to ensure greater visibility of the retail sector and recognize its existing contribution to innovation to ensure that existing and potential initiatives are appropriately configured. Related to this is the lack of awareness among policymakers and society regarding the ways in which retailers actually innovate. As we have suggested, innovation often is not controlled by just one company, or one operator in the supply chain. Operators in supply chains integrate more and more and share risks in developing new processes or products. For example, European Technology Platforms provide effective mechanisms to achieve greater collaboration and knowledge exchange amongst stakeholders in relation to technological innovation. Relatively few such platforms are relevant to retailing, or have retail members, however. Encouraging retailer participation in existing European platforms relevant to retail innovation, or even supporting the creation of new retail-specific platforms, could serve to build stronger awareness and engagement. There is also a clear difference in type and scale of – and capacity for – innovation activity between large retailers and retail SMEs. SMEs are often less able to find knowledge and research related to their innovation ideas. The creation of specific SME information exchange networks or hubs, perhaps building on the existing SME helpdesk infrastructure, might allow such firms to exploit open innovation opportunities.

Costs & finance

Retailer's cost models often mean that it can be hard to generate or secure the finance required to support radical innovation projects, or even incremental projects that require significant costs in rollout. Retail margins are necessarily tight and firms already need to invest huge amounts in terms of physical space, employees, administrative systems, and project processes. These costs are particularly high for large firms due to the sector being administratively complex, but smaller firms face even harder choices. Emerging technology systems and standards can impose high costs on firms and slow down the pace of innovation. Recent examples include electronic payments systems, mobile web adoption, cash handling and security issues. As more and more of the banking sector does not handle cash, the retail sector has become the new “wallet” for many consumers. There is a need for retailers to engage in financial innovations such as seamless payments. Recent concerns relate to the extra cost of high speed Internet. The use of technology systems can be a particular barrier for SMEs due to high costs by comparison with the firm's financial resources. Emerging technologies such as analyzing big data will become a critical success factor for successful retailers, but its development and application will be expensive. Similarly, other technologies with high innovation growth potential will carry with them potentially high costs, such as: 3D printing,

digital wallets, and RFID solutions. High barriers to adoption are not restricted to store-based retailers. There is a commonly held belief that it is not particularly expensive to start up an online shop. In practice, advanced e-tailing means heavy investments in commercial web platforms, design, search engines, payments and security as well as in logistic solutions.

Availability of skills and human resources

Resource barriers to innovation are not just financial in their nature. The retail sector faces numerous problems in terms of access to the resources needed to identify innovative opportunities, prioritise competing opportunities and take chosen projects forward. (This is especially the case for technological innovation.) This applies in particular to the scarcity of appropriately skilled labour, and the high cost of those human resources¹⁶. For example, by comparison to firms in other industries, most retailers do not always have the capacity to start up or participate in laboratory environments (so-called open innovation) and innovate in a consistent way. Participation in existing project platforms can also be challenging. The Commission's existing funding programmes can be inflexible in terms of their requirements for retailer involvement or have a project period that is not consistent with retail processes. Retailers also need administrative routines and application processes that are easier. A separate entry route for SMEs, as is being proposed for Horizon 2020, will improve the possibility for such retailers to take part in the funding processes.

Gaps in skills and inadequacies in levels of education and training are other areas that hinder the innovation process, as existing mechanisms for the identification of innovation-related skills gap are weak. The sector needs coordination with established national sector skills groups, perhaps in association with the newly-established European sectoral skills council. Stakeholder would be more aware of the challenges, for example, if the scope of EU Skills Panorama could support forecasting of innovation-related skills needed in the sector; although the expert group is mindful of the statistical shortfall in this area. A related barrier to innovation related to retail education & training is the limited co-operation between retail and non-retail companies, research and education organizations (see Annexe theme 5).

There are skills and human resource barriers specific to retail SMEs. Recent UK research showed that retail SMEs are characterized by a general reluctance to participate in formal training¹⁷. Reluctance might come from low motivation but also from limited information. Very often, the formal educational programs available focus on large retailers the needs of which do not necessarily overlap with those of retail SMEs. Small retailers roll out small-scale innovation projects related to retail specialization, customer service, and personalized retail offerings for which education and training should account.

Successful innovation projects are often based on co-operation between retail businesses, firms from other sectors, or companies involved in scientific research. However, there is still plenty of room left for co-operation in retail innovation-related education and training, where barriers presently exist. In line with the strategic framework for European cooperation in education and training, enhancing creativity and innovation, including entrepreneurship, at all levels of education and training – including the acquisition of transversal competences – should be promoted and the functioning of the knowledge triangle (education-research-innovation) should be ensured. Partnerships between enterprises and educational institutions as well as broader learning communities should be promoted. Another area in which barriers could be reduced is to encourage universities, training bodies and research institutes to offer education that includes retail sector- and technology-specific skills. This is very important to SMEs and there is a need to use creative mechanism for providing such retailers with support, such as through the use of vouchers for training and education.

A final barrier is the pooling of non-business related knowledge. The near future of retailing is shaped by the developments of ICT, and omnichannel solutions that require not only business but application of knowledge developed in other disciplines. Retail education & training have traditionally focused on a more business-oriented knowledge but new trends adopted by retailing are not necessarily coming from business-related areas – but rather from the ICT sector, computer science, neuropsychology, mathematics, biology or aesthetics.

Risks attaching to innovation

Operating in a market that is open to anyone, means that the risk of investing in innovations is clear. There is a need to ensure that new regulations are designed to increase the opportunity for retail sector innovation, and contribute to reducing the perceived risk in innovating. A better understanding by regulators of the nature of open innovation (that innovation in retailing can span retailer firms, the wider value chain and includes the consumer) should be sought. For example, retailers and suppliers collectively develop private label products, which serve to stimulate consumer choice, and should not necessarily be seen as a threat to manufacturers or producers.

For multinational retailers, an important barrier and risk is the existence of different technology and systems adoption rates in different countries. This risks lack of interoperability between systems and there is a need to ensure that regulations are mindful of the lag between technology standards and regulation (e.g. mobile payment systems, consumer information security and privacy, data protection). Another risk lies in the recognition and accommodation of retail business models in different markets. Some retail business models are disadvantaged because they are treated as individual entities, which may reduce their potential to innovate. The use of (customer) data will play a key role in business models finding new ways to compete and serve customers better. However, current regulations concerning data protection might limit the ways in which new retail business models can innovate and thrive.

Regulation and policy support

If the European market remains fragmented, retailers will not be able to be successful. If European retailers are successfully building outside of the EU, that would create many opportunities for EU suppliers to export or invest globally. The main barriers are those that hinder the completion of the Single Market. Fully harmonizing the rules across the EU will bring great benefits to the retail sector and will help stimulate broader innovation. Retail business models need scale to succeed, particularly cross-border. A recent survey of European retailers suggested that 25% believed that they could increase revenues by up to one quarter if they could sell more effectively online and cross-border in Europe. Particularly problematic regulatory hurdles were seen to arise from product return laws, differing VAT levels between markets, and the general cost of compliance of different national laws dealing with consumer transactions (such as distance selling or involving data transfer).¹⁸

Often, a lack of transparency and a lack of legislative harmonization regarding space investment at national, regional and local/municipal level form a barrier to facilitate retail expansion. It is difficult for companies to establish and build stores in particular Member States. Further, administrative requirement put off entrepreneurs and many start-ups lack the access to funding.

Unclear and complex intellectual property law is expensive for businesses. (Witness the complex, international disputes between smartphone competitors.) This is a barrier to innovation. Because of these legal uncertainties, retailers cannot or are hesitant to develop applications. EU legislation needs to be implemented by member states into national rules. Barriers occur when these rules are

not implemented simultaneously but rather differently. Furthermore, proper enforcement of these rules serves to increase barriers to the Single Market.

A particular barrier, especially for retail SMEs, arises not so much from the level of VAT on transport charges but more the complexity of the distance selling regimes requiring firms to account for VAT on a destination rather than origin basis. Many customers require certainty of price before ordering and it is difficult for the e-tailer to price goods consistently where there is such a significant range of VAT rates. This becomes even harder to manage when different countries apply lower or even zero rates to certain products. VAT payments for parcel deliveries within the EU are also high and cause a huge administrative burden for retailers. In some cases, sending parcels to Australia and the USA are cheaper than sending parcels to EU countries, such as Malta or Cyprus. This is a significant disincentive to cross-border e-commerce. The Commission should ensure proper, equal, and similar implementation of rules by member states and seek alternatives to its infringement procedure.

Finally, the retail sector often seems to fall outside the scope of national and EU support funds. The combined sector in Europe consists of over 6 million enterprises, a turnover of almost 10 trillion Euros, provides a career to 18.6mn people and represents over 1 trillion Euro of added value to the European economy (Eurostat 2010). In contrast, the sector receives only €2bn Euro out of the €53 bn of funding for innovation, or 3%. This barely represents the importance of the sector and there is a need to establish more service- or retail-specific calls. This could be done by expanding the financial instrument Horizon 2020 in a way that supports the retail sector, and by developing mechanisms to encourage retail SMEs to take part.

Case study 8: ESRC Retail Sector Initiative, UK.

In 2013, the UK's Economic and Social Research Funding Council announced a focused £2.5mn call for collaborative projects and knowledge exchange activities that will maximise the impact of social and economic research on the retail sector. In addition to its own Knowledge Exchange Opportunities (KEO) funding, the Council will also harness other, existing research vehicles including working with the UK Technology Strategy Board to engage with the 4,000 businesses in its community, and to deliver an extensive programme of retail-themed Knowledge Transfer Partnerships (<http://www.ktponline.org.uk/>). The Knowledge Transfer Partnership offers retail businesses the opportunity to work in partnership with an academic institution to obtain knowledge and expertise to which they currently have no access, to address their business challenges and embed sustainable innovation.

A Retail Sector Initiative Partner Database aims to help stakeholders find appropriate partners by providing details of research interests and contact details so participants foster direct links. An Academic Co-ordinator has been appointed to facilitate knowledge exchange between and promote impact from the successful applicants to the Initiative.

5. Recommendations

The recommendations of the Expert Group are derived from a clearer understanding of the characteristics of innovation in retailing presented in this report, together with an assessment of the drivers and barriers affecting the future nature, pace and incidence of retail innovation within Europe. They are based on an iterative process within the Expert Group that, in the final stage of the Group's work, generated over 150 potential recommendations. These were refined in the context of the priorities suggested by the European Retail Action Plan, organized by broad objective, and agreed by the Group after discussion with officials in DG Research & Innovation and DG Internal Market and Services as to their feasibility. The recommendations in this report are the innovation- and retail-specific ones given the highest priorities and are presented in the following table. Each recommendation is accompanied by a brief elaboration of the action, an indication of the stakeholders to whom the recommendation is directed and a proposed mechanism for taking the recommendation forward.

The recommendations are made not just to the Commission but also to other relevant stakeholders, including trade associations, universities and retailers themselves. Some of the recommendations are designed particular for the trade associations. The Expert Group believes it could be useful to invite members from different trade associations to discuss the findings of this report and the implications for association members. For example, developing an information platform and carrying out regulatory screening would seem to be a natural part of the remit of most trade associations.

				To this end, the group welcomes the establishment of the high level group on retail competitiveness, tasked with monitoring the progress achieved for the actions identified out of the European Retail Action Plan.
	2. Audit existing initiatives, platforms and programs of relevance to sector	It is clear that the Commission is very active in bringing forward project funding to stimulate innovation. However, awareness in the retail sector of these opportunities is still very low, especially amongst SMEs. To find relevant information, information professionals often have to be hired, even by the largest firms. There is a need for a better and more accessible mechanism for the identification, prioritizing and channeling of commercial, innovation-related initiatives and research.	Trade associations	<p>Create a “one-stop-shop” for information, specifically aimed at retail firms (large, SME, micro, and start up) where relevant information on innovation initiatives can be found and shared. This could be a collaborative platform based on engagement from all visitors.</p> <p>Trade associations could screen Horizon 2020 calls to inform retailers of the areas presenting opportunities for them to engage with consortia and contribute to design project proposals that include activities relevant for retail innovation.</p>
A.2 Develop opportunities for greater collaboration and knowledge exchange amongst stakeholders	1. Encourage retailer participation in existing European Technology Platforms relevant to retail innovation. Create a platform network of ETPs that address retail innovation and related research.	European Technology Platforms are created by interested parties, where there is a specific research agenda already established in the European funding programmes, and are not funded by the Commission. The responsibility therefore lies with existing ETPs with relevance to retail innovation to solicit retailer	<p>Existing ETP Chairs</p> <p>Retail associations: Eurocommerce Eurocoop Independent Retail Europe ERRT</p>	Identify technologies in which the retail sector has a long-term interest. Identify the most influential and experienced senior managers within the sector who might be prepared to collaborate in the existing ETPs or in the establishment of a network of

		<p>engagement; and with influential individuals within the sector itself to promote greater participation in ETPs by the retail sector as well as by universities and research institutes</p> <p>A further way of promoting research relevant to the retail sector would be to create a network similar to Prosumer.net that brings together ETPs developing activities relevant to the sector. This network could then develop a roadmap for research that is retail relevant and from there coordinate an innovation strategy.</p>	Universities and research institutes	<p>ETPs developing work which is relevant for retail innovation.</p> <p>Encourage universities & research institutions developing work relevant for retail innovation to collaborate to a greater extent with ETP Chairs.</p>
	2. Identify areas of relevance to the retail sector where harmonization of standards would enhance European retail innovation capability.	<p>There is often a lag between new technology and standards (in both member states and at EU level) and a lack of a 'retail reflex' by those involved in standard-setting, which could impede willingness to innovate. Examples include:</p> <ul style="list-style-type: none"> - Mobile payment system standards - Product traceability - RFID standards - E-communication - 3D printing <p>For instance, today's consumer expects immediate and accurate product information. In fashion retailing, many concerns are expressed over timely information in relation to country of origin, product safety and degree of product sustainability. A lack of standardization in information</p>	<p>Trade associations</p> <p>European Committee for Standardization (CEN)</p> <p>Retailers</p>	<p>Trade associations need to prioritize issues to be brought before the CEN technical committees.</p> <p>For those issues identified, retailers should approach National Standardization Bodies in order to engage in Technical Committees determining standards relevant for the retail sector. In areas in which standardization still does not exist but would support retail innovation, retailers can propose the creation of new Technical Committees..</p>

		provision hinders innovation in this area.		
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OBJECTIVE B: FUNDING AND PROJECTS

Desired outcome: Ensure greater participation by retail firms of all sizes and sectors in European innovation projects.

Recommendation	Action	Elaboration/justification	To whom is this recommendation made?	How will this recommendation be taken forward?
B.1 Ensure that existing funding initiatives are more responsive and specific to the needs of the retail ecosystem ('deepening' of policy and frameworks)	1. Establish more service- or retail-specific calls within the Horizon 2020 programme	<p>Topics could include:</p> <ul style="list-style-type: none"> - Big data (e.g. data mining for better business analytics/ customer insights/ sales forecasting) - Intelligent technologies (e.g. RFID, NFC, GPS-tracking, mobile payments) - Inter-firm supply side application areas & B2B marketplaces <p>Within the Horizon 2020 there is a particular initiative aimed at SMEs, although awareness of this is insufficiently developed in the sector.</p>	<p>Directorate General for Research and Innovation</p> <p>Trade associations</p>	DG Research and Innovation, should discuss the ways in which call topics in relevant areas could be made more retail-specific such that they attract interest from the sector.
	2. Increase flexibility of existing funding vehicles	<p>The coordinators of funded consortia are insufficiently aware of the impact of differential funding rates on retailer participation, where the field partner is often disadvantaged. Thought should be given to ensuring that funding formulae are adapted to affordability within the retail sector. The expert group understands that the conditions for</p>	<p>Directorate General for Research and Innovation</p> <p>Trade associations</p>	<p>Ensure that the simplifying process already developed for the Horizon 2020 programme (including attention to funding rates and shorter timescales for projects) is working to the benefit of the retail sector.</p> <p>Ensure trade associations and prospective applicants are better aware of the upcoming calls. For example. a "fast</p>

		participation will likely be quite favourable in Horizon 2020.	Directorate General for Research and Innovation Retailers	track” route and a continuously open call for SMEs is planned for 2014/2015 Ensure Consortium leaders are aware of the characteristics and limitations of the retail sector, which may affect their ability to engage in funded research projects.
	3. Improve administrative routines	The accessibility of funding schemes and the applications process (the form-filling burden) needs further attention, given that even the largest retail firms often have to employ independent advisors to audit and prioritize research initiatives and complete applications for support.	Directorate General for Research and Innovation	The Group welcomes the simplification of rules proposed for Horizon 2020 but urges the Directorate General for Research and Innovation to monitor their effectiveness in encouraging engagement of retail firms of all sizes. The Group considers that a Horizon 2020 Help Desk service for retail SMEs would be an advantage.
	4. Ensure awareness of COSME funding and facilitation available to retail SMEs from 2014	A separate entry route for funding of SMEs is being proposed through the COSME scheme, and this is to be welcomed. Retail SMEs make up 20% of all SMEs in EU27. SMEs can be a useful source of retail innovation. However, they suffer from lack of awareness and resources and can be naturally risk averse.	Directorate General for Enterprise Trade associations representing retail SMEs Ecommerce Europe	Ensure retail SMEs are specifically targeted for COSME platform. Ensure 10 Small Business Act principles are applied to the SMEs in the retail sector ⁵ .

⁵ The ten principles are: (1) Entrepreneurship, (2) Second chance, (3) Think small first, (4) Responsive administration, (5) State aid and public procurement, (6) Access to finance, (7) Single market, (8) Skills and innovation, (9) Environment, and (10) Internationalization. (Source: SME Performance Review, European Commission, <http://ec.europa.eu/enterprise/policies/sme/facts-figures-analysis/performance-review/>)

		An increasing number of online retail start-ups nevertheless have the capability to provide significant sources of innovation across the Union.		
B.2. Increase scope of innovation funding initiatives	1. Create a retail SME innovation hub	<p>A hub would undertake actions building on the wide range of existing initiatives. It would direct firms to existing mechanisms and forthcoming initiatives including:</p> <ul style="list-style-type: none"> • European Associations, networks and exchange platforms for SMEs: • Information on legislation falling under the Services Directive - Points of Single Contact (in the framework of the Services Directive): • Mentoring initiatives: Digital entrepreneurship (DG Enterprise and Industry) • Enterprise Europe Network • European Small Business Portal • IP SME corner 	<p>Existing SME Helpdesk (Your Europe - Business)</p> <p>IPR Helpdesk</p> <p>Member states</p> <p>Directorate General for Enterprise</p>	<p>Build upon the existing SME Helpdesk (Your Europe - Business)</p>
	2. Establish network of retail labs in order to prepare for "tomorrow's stuff".	<p>Lab focus could include:</p> <p>(a) Open-innovation ecosystem, integrating concurrent research and innovation processes.</p> <p>(b) Co-creation, exploration, experimentation and evaluation of innovative ideas, scenarios, concepts and related technological artefacts</p>	<p>Universities & Higher Education sector</p> <p>Member state research funding councils</p>	<p>Evaluate the resources already available to offer a retail lab.</p> <p>Clarify what a laboratory can offer in terms of development and innovations.</p> <p>Expand existing networks.</p> <p>Emulate the model from big</p>

		<p>in real life use cases.</p> <p>(c) Exploration of specific technologies such as big data and data mining techniques, 3D printing, RFID solutions, NFC.</p> <p>(d) Detailed information on the cost structure of various products as well as new ways of giving transparent and comparable information about products.</p> <p>Retail labs could redeem SME vouchers (see C2.3)</p>		<p>retailers that already have lab environments.</p> <p>Explore a consortium-funding model. Separate funding initiatives might be developed in universities within individual member states, which have a retail lab environment.</p>
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OBJECTIVE C: EDUCATION, TRAINING AND SKILLS

Desired outcome: Identify, stimulate and support investment in retail skills that increase potential for innovation and growth in the sector.

Recommendation	Action	Elaboration/justification	To whom is this recommendation made?	How will this recommendation be taken forward?
<p>C.1. Create new and enhance existing mechanisms for the identification of innovation-related skills gaps, and support of retail-innovation related training and recruitment activity by firms.</p>	<p>1. Ensure recently established European Skills Council - Commerce places a priority on co-ordination of support for innovation-related skills training & recruitment activity. Recommendation to be consulted with social.</p>	<p>The Council needs to be sufficiently flexible to accommodate the different needs of retail markets in Member States and to co-ordinate its work with established national sector skills groups in respect of retail innovation.</p>	<p>European Skills Council - Commerce Committee for Retail Sector Social Dialogue MS sector skills councils Trade associations</p>	<p>The Council and the Committee should give emphasis to identifying & sharing relevant best practice initiatives within member states on innovation.</p> <p>The existing Network on National Observatories on Skills Needs and Mismatches should co-ordinate member state support for European-wide goals on retail innovation.</p> <p>EU Skills Panorama should develop its coverage of retail sector skills and skills gaps.</p>
<p>C.2. Support retail education & training initiatives relevant to innovation</p>	<p>1. Facilitate exposure of senior management to customer-centric innovation</p>	<p>Senior retail managers have little time and sometimes little experience of the types of innovation that could be important to some customers.</p> <p>-</p>	<p>Trade associations MS sector skills councils (to be consulted with social partners)</p>	<p>Methods could include:</p> <ul style="list-style-type: none"> - Reverse mentoring schemes - Supplementing the European Retail Action Plan with the encouragement of an “adopt-a-shop” principle (presently under discussion) - Retail labs engagement - Executive education

				programmes - Exchange programmes and internships
	2. Encourage universities, training bodies and research institutes to offer education that includes retail sector- and technology-specific skills	<p>There is a limited amount of knowledge exchange of any kind between HEIs and retail organizations and trade associations, least of all in respect of innovation, despite opportunities already being available.</p> <p>The encouragement of greater relevant knowledge exchange activity might involve such mechanisms as:</p> <ul style="list-style-type: none"> - The EU Knowledge Alliance initiative - Individual MS knowledge exchange programmes <p>In addition to formal knowledge exchange activity, collaboration could also include:</p> <ul style="list-style-type: none"> - Professorial internships - Doctoral students embedded in retail firms engaging in research into specific retail topics - Internships for masters' students within retail businesses - Funding of executive MBAs <p>Formal education and training for senior retail managers might</p>	<p>Directorate General for Education, Culture, Multilingualism & Youth</p> <p>(University-Business Co-operation Initiative/ Knowledge Alliances)</p> <p>Member state research councils</p> <p>Higher Education Institutions</p> <p>Scholarly associations (e.g. European Association of Education & Research in Commercial Distribution)</p> <p>Retailers</p>	<p>Create a directory of European training & education opportunities relevant to retail innovation, jointly between the DG and the relevant trade associations.</p> <p>Encourage MS research councils to consider retail-specific knowledge exchange programme funding</p> <p>Invite leading retailers to speak at academic association conferences & research council events with a view to developing a research agenda for retail innovation.</p> <p>Retailers together with universities to apply for the creation of a Knowledge Alliance on retail and in response to calls under the Leonardo Da Vinci scheme. (http://ec.europa.eu/education/leonardo-da-vinci/participate_en.htm)</p> <p>Examples of projects under the Leonardo Da Vinci scheme involving retailing:</p>

		include: <ul style="list-style-type: none"> - R&D innovation management - Commercialization of ideas - Design thinking 		http://www.adam-europe.eu/adam/project/search.htm
	3. Develop mechanisms to encourage retail SMEs and start-ups, to take part in appropriate innovation-related training or skills development.	Retail SMEs have little time, incentive or resource to allow them to participate in skills development or training.	Directorate General for Enterprise Member states' research and enterprise agencies.	Proven mechanisms in the past have included: <ul style="list-style-type: none"> - SME vouchers for training and education, as well as to acquire missing expertise (e.g. Enterprise Ireland, Aston, ESRC UK) - Establishment of social networks in companies for information sharing - Improvement in provision of higher level apprenticeships/internships in relevant retail skills areas

OBJECTIVE D: REGULATORY ISSUES

Desired outcome – Ensuring that new regulations are designed and existing regulations modified to increase the opportunity for retail sector innovation.

Recommendations	Action	Elaboration/justification	To whom is this recommendation made?	How will this recommendation be taken forward?
D.1. Broadening of policy and regulation to recognize that innovation in retailing spans firms and value chains, including consumers.	1. Clarification of the rules	<p>Some retail business models are not capable of developing their full potential for innovation, because of regulatory constraints developed for other reasons.</p> <p>For example, exchange of sensitive information between independent retailers even if part of the same group is in general not possible. However, there are exceptions that apply to small businesses that often they are not aware of.</p>	Directorate General for Competition	In the specific case of competition policy affecting the retail sector, a working paper explaining in more detail the interpretation of the rules and the possible exceptions/derogations could be produced by DG Competition
	2. Support national governments to set up, and increase the take-up of R&D tax credits by, the retail sector	The definition of retail innovation makes it very difficult for the sector to successfully apply for and employ tax credits.	Member states	Identifying and prioritizing the kinds of R&D activities undertaken by retailers, and by suppliers on their behalf that might be supported by tax credits.
D.2. Horizontalization – ensuring that other policies or regulations not explicitly designed to do so can indirectly improve the climate for retail sector innovation.	2. Screening of the regulatory framework (the bulk of legislation having a direct or indirect effect on retail activities) to assess its impact on retail innovation.	Regulations are important factors influencing the innovative activities of companies. They can either hamper (e.g. lack of regulation can increase risk of investing in innovation; regulation can provoke lock-ins in insufficiently ambitious and outdated technologies) or foster innovation (ambitious standards offer opportunities for those being	Trade Associations	The European Commission has developed a methodology for screening the innovation impacts of existing regulatory frameworks with a view to identifying their effectiveness as catalysts of innovative behaviours. Trade Associations could use this methodology to

		<p>the first to meet them).</p> <p>Screening the regulatory framework affecting retail activities will allow identification of the rules that need to be improved or updated and/or new rules that need to be implemented in order to provide sufficient and continuous incentives to drive retail sector innovation. For example, an area of growing importance to multichannel and e-commerce firms is the regulations affecting pricing regulations for parcels.</p>		<p>screen the regulatory framework affecting retail activities in Europe, to build evidence on its impact on innovation activities and identify where regulation needs to be improve to better foster retail sector innovation.</p>
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Appendix 1

Terms of Reference

"In line with the Innovation Union main objective, policies need to be designed to support all forms of innovation, including specific approaches for innovative services with high growth potential. The retail sector is a key link between customers and suppliers acting as innovation driver and multiplier. However, the retail sector is not well integrated into the EU innovation system and the current Research and Innovation (R&I) system does not take into account specificities of retail innovation. To this end an **expert group will be set up to explore, together with various stakeholders, different ways in which the retail sector can both contribute to, and benefit from**, the development and deployment of innovative products, services and technologies, including linking with the EU R&I programmes taking account of modern forms of retailing such as e-commerce. Particular attention will be paid to those services, products and technologies that have the potential to streamline the functioning of the internal market. The expert group will recommend possible short and medium term priority actions to help increase sector's competitiveness through innovation."

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References

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- ¹ Chesbrough, H. W. (2003). *Open Innovation: The new imperative for creating and profiting from technology*. Boston: Harvard Business School Press.
- European Commission, (2013), *State of the Innovation Union 2012. Accelerating Change*, Directorate General for Research & Innovation, http://ec.europa.eu/research/innovation-union/pdf/state-of-the-union/2012/state_of_the_innovation_union_report_2012.pdf
- ² European Commission, (2013), *Setting up an European Retail Action Plan*, COM(2013) 36 final.
- European Commission, (2013), E-COMMUNICATIONS HOUSEHOLD SURVEY REPORT, Special Eurobarometer 396. Directorate-General Communications Networks, Content and Technology.
- ³ European Commission, (2012), *Terms of Reference for Expert Group on Retail Sector Innovation*.
- ⁴ European Commission, (2011), *European Competitiveness Report 2011*, SEC(2011) 1188, Staff Working Document, http://ec.europa.eu/enterprise/newsroom/cf/getdocument.cfm?doc_id=7129
- ⁵ European Commission, (2012), *European Competitiveness Report 2012. Reaping the Benefits of Globalisation*.
- ⁶ European Commission, (2011), *Sectoral Innovation Watch: Retail & Wholesale Trade Sector. Final Sector Report*, Europe INNOVA, DG Enterprise and Industry.
- ⁷ European Commission, (2011), *Sectoral Innovation Watch: Retail & Wholesale Trade Sector. Final Sector Report*, Europe INNOVA, DG Enterprise and Industry.
- ⁸ European Commission, (2012), *The 2012 EU Industrial R&D Investment Scoreboard*, DG Research & Innovation, <http://iri.jrc.ec.europa.eu/scoreboard12.html>
- European Commission (2007), *Europe's demographic future: Facts and figures on challenges and opportunities*. Directorate-General for Employment, Social Affairs and Equal Opportunities Unit E.1
- ⁹ Metka, S. & Galouj, F., (2012), 'Seizing the Opportunities of Service Innovation', *Policy Brief 7*, Innovation for Growth i4g, http://ec.europa.eu/research/innovation-union/pdf/expert-groups/i4g-reports/i4g_policy_brief_7_-_service_innovation.pdf
- ¹⁰ Oxford Institute of Retail Management, (2007), *Innovation in the UK Retail Sector*, NESTA, <http://www.nesta.org.uk/library/documents/inno-in-services-retail-report.pdf>
- ¹¹ Clark, B., (2008), Lateral Action blog entry, <http://lateralaction.com>.
- ¹² Martin, R.L., (2009), *The Design of Business: Why Design Thinking Is the Next Competitive Advantage*, Harvard Business School Press Books.
- ¹³ According to FEVAD: <http://www.fevad.fr/documentation/edito-dans-le-marasme-economique-ambiant-la-situation-du-e-commerce-continue-de-surprendre-par-sa-vitalite-y-compris-sur-le-plan-de-l-emploi#topContent>
- ¹⁴ Reynolds, Jonathan and Hristov, Latchezar (2009) *Are there Barriers to Innovation in Retailing?* The International Review of Retail, Distribution and Consumer Research, 19 (4). pp. 317-330. ISSN 0959-3969
- ¹⁵ Larsen, P., and A. Lewis. 2007. How award-winning SMEs manage the barriers to innovation. *Creativity and Innovation Management*. 16(2): pp. 142-151.
- ¹⁶ Observatory of European SMEs, 2007.
- ¹⁷
- ¹⁸ Accenture, (2012), *European Cross-border E-commerce: The Challenge of Achieving Profitable Growth*, study commissioned by the European Retail Round Table.

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The Expert Group on retail sector innovation was established in 2013 to identify the main innovation drivers and barriers in the European Retail sector and recommend possible short to medium-term priority actions to help increase the sector's competitiveness through innovation. The recommendations aim at building awareness of the retail innovation potential for competitiveness, increase the participation of retail firms in European innovation projects, promoting investment in retail skills and ensuring that regulations are drivers for retail sector innovation. They are addressed not just to the Commission, but to other stakeholders who have the capacity to influence the future nature, pace and incidence of innovation within European retail firms.

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