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2020 - Volume 22 Issue 2

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ISSN 1741-6264

International Journal of Management Cases is published by:

Access Press UK,
1 Hillside Gardens ,
Darwen,
Lancashire,
BB3 2NJ
UK

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Corporate cameo cases: ecosystem services, biodiversity and business

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Abstract

Ecosystem services and biodiversity are normally associated with the environmental sciences, but they also underpin a wide range of business activities. At the same time, there are also concerns that many companies ignore the damaging impact their operations can, and do, have on ecosystem services and biodiversity. This paper outlines some of the features of ecosystem services and biodiversity, provides four cameo cases of how three major companies, namely Unilever, Nestlé and Dow Chemical Company, and one joint international association, PIECA and IOGP, are publicly communicating their approaches to ecosystem services and biodiversity and offers some concluding reflections on two sets of the wider issues, namely shared value and equity and measurement and valuation.

Introduction

While ecosystem services and biodiversity are normally associated with the environmental sciences, they also underpin a wide range of business activities. The formal concept of ecosystem services, simply defined as the contribution of natural systems to human wellbeing emerged in the 1970's, but businesses have been increasingly using land and natural resources as productive assets over many centuries. While recent years have seen growing awareness that many businesses rely on ecosystem services, there is a paradox here in that 'healthy ecosystems form the basis for numerous business operations' yet 'many companies contribute to the degradation of ecosystem services via the same business operations which depend on the ecosystem's health' (Natural Capital Coalition 2017). In a similar vein, there is widespread recognition that the concept of biodiversity, which began to be widely adopted in the 1980s and can be simply defined as, the variety of plant and animal life, 'is fundamental to long term business survival, there is growing recognition that business and industry can have major negative impacts on biodiversity resources' (International Finance Corporation 2020). That said, there are concerns that many companies ignore the impact of their operations on ecosystem services and biodiversity. With these thoughts in mind, this paper outlines some of the features of ecosystem services and biodiversity, provides some simple case studies of how three major companies, namely Unilever, Nestlé and Dow Chemical Company, and one joint international association, PIECA and IOGP are publicly communicating their approaches to ecosystem services and biodiversity and offers some concluding reflections on two sets of the wider issues, namely shared value and equity and measurement and valuation.

Ecosystem Services and Biodiversity

Danley and Widmark (2016) claimed that ecosystem services is a phrase with many meanings. The United Nations Millennium Ecosystem Assessment (2005) succinctly defined ecosystem services as 'the benefits people obtain from ecosystems' while for Fisher et al. (2007) 'ecosystem services are the aspects of ecosystems utilized (actively or passively) to produce human well-being.' More extensively, for the UK National Ecosystem Assessment (2020) 'ecosystem services are the benefits provided by ecosystems that contribute to making human life both possible and worth living.' Further, the UK National Ecosystem Assessment (2020) asserts that 'examples of ecosystem services include products such as food and water, regulation of floods, soil erosion and disease outbreaks, and non-material benefits such as recreational and spiritual benefits in natural areas' and that the term services is usually used to encompass the tangible and intangible benefits that humans obtain from ecosystems, which are sometimes separated into goods and services.'

A number of types of ecosystem services have been recognised. The European Environment Agency (2019), for example, identified three categories of ecosystem services namely: provisioning services, maintenance and regulating services, and cultural services. Provisioning services are the tangible products that people obtain from ecosystems, they are vital for the economy, include biomass, water and fibre, energy and many have well developed markets and valuation systems. Maintenance and regulating services embrace the ways ecosystems control or modify the environment. They are not consumed as such, but they affect the activities of people and businesses and they include includes soil formation and composition, pest and disease control and climate regulation. Cultural services are the more intangible benefits people derive from the natural world, they embrace the significance of nature within people's culture and include recreation, spiritual and intellectual sustenance and a sense of place.

While there is no universally agree definition of biodiversity the term is generally taken to refer to the variety and variability of life on Earth and is typically seen as a measure of variation at the genetic, species, and ecosystem level. The Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (2019), for example, simply refereed to biodiversity as 'the diversity within species, between species and of ecosystems.' Swingland (2013) define biodiversity as 'species, genetic, and ecosystem diversity in an area, sometimes including associated abiotic components such as landscape features, drainage systems, and climate.' For the United Nations Convention on Biological Diversity (1992) biodiversity is 'the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems.' More commercially, the Cambridge University for Sustainability Leadership (2019) suggested that 'biodiversity fundamentally underpins the benefits that businesses derive from natural capital and supports the key ecosystem functions that ensure the delivery of business operations and productivity.'

While ecosystem services and biodiversity are often seen as separate concepts, there an important relationship between them. This relationship has been described as 'multilayered' by Mace et al. (2012) in that 'biodiversity combines with the concept of ecosystem services at all levels: it provides the support to key processes, it

directly affects the delivery of some ecosystem services and it may itself be the good that is valued.’ In a wide ranging literature review, Harrison et al. (2014), explored some of the linkages between biodiversity and ecosystem services and reported that while the links were highly complex and service dependent, the majority of them were positive. Here, ‘species level traits were found to benefit a number of ecosystem services, with species abundance being particularly important for pest regulation, pollination and recreation, and [species richness](#) for [timber production](#) and [freshwater](#) fishing’ (Harrison et al 2014). In a similar vein, Harrison et al. (2014) suggested that ‘the services of water quality regulation, water flow regulation, mass flow regulation and landscape aesthetics were improved by increases in community and habitat area.’

During the last decade there has been growing corporate awareness of the importance of ecosystem services and biodiversity in providing and maintaining the goods and services that support businesses and economic growth. Almost a decade ago, the International Geosphere-Biosphere Programme (2012) suggested that ‘current trends in biodiversity and ecosystem services are sharply and dangerously negative’ and such concerns have led to increasing corporate recognition of the fragility of ecosystem services and biodiversity. This, in part, is reflected in the growth of corporate sustainability programmes. Here, the majority of leading global corporations have developed wide ranging sustainability and corporate social responsibility strategies designed to publicly report on their environmental, social and governance commitments.

In highlighting ‘our sustainability ambition’, AstraZeneca (2019a), for example, claimed ‘how we operate supports sustainable ecosystems for healthcare that benefit ‘environmental protection’ its 2019 Sustainability Report, AstraZeneca (2019b) recognised that ‘global society is depleting some of the Earth’s natural capital’, that ‘the planet’s life-supporting systems and the condition for life are under threat’, and that ‘the time to act is now.’ In its 2019 Sustainability Report BP (2020) stressed that the company looked to ‘work in ways that result in no accidents, no harm to people, and no damage to the environment, including no net loss to biodiversity when undertaking new projects in sensitive areas.’ and that it was ‘working to develop industry good-practice guidance in line with the launch of the new post-2020 global biodiversity framework.’ More specifically, a number of companies and corporate associations have publicly reported on their approach to ecosystem services and biodiversity and the following four cameo case studies provide some insights into these approaches.

Unilever is a British-Dutch transnational consumer goods company, it owns over 40 brands, its product range includes food, beverages, cleaning agents and beauty and personal care products, which are on sale in almost 200 countries and it employs 155,000 people. Nestlé is a Swiss based multinational food and beverages processing company, it has over 2,000 brands, which are available in over 180 countries and it employs some 350, 000 people. Dow Chemical corporation is an American based multinational corporation, its products include plastics, chemicals and agricultural products, it has operations in over 150 countries and it employs 54,000 people. IPIECA is a global not for profit oil and gas industry association for environmental and social issues and IOGP is the international association of oil and gas producers.

Unilever

In looking to explain 'why businesses are getting behind the biodiversity agenda' Unilever (2019) recognised 'the health of our planet has reached a dangerous tipping point, with a massive loss of nature and biodiversity putting economies at risk and threatening the livelihoods of millions of people.' More specifically Unilever (2020) reported on biodiversity and its relationship with its suppliers and emphasised that part of the value of its brands is the assurance the company gives its customers on the quality and safety of its products. The company argued that its reputation is built on care for people and the environment throughout the supply chain. Here, farmers often play an important role and they, depend on the 'ecosystem services' provided by pollinators, predators, the organisms that build soil fertility and the forests and riparian strips of native vegetation that help maintain rainfall and water flow in rivers, and reduce flooding' (Unilever 2020).

Unilever suggested that farmers traditionally saw themselves as producers with limited concern for wildlife, biodiversity or nature conservation, but that there is a growing awareness that farmland provides important resources and habitats for migrating birds and insects, that bees act as pollinators and raptors as pest-controllers, that wetlands and riparian areas serve as pollution-filters preventing toxic or polluting substances, arising from farm practices, entering rivers and water supplies. At the same time the company suggested that the underlying genetic diversity, that plant and animal breeders harness, to improve yield and quality, enhance pest and disease resistance, and extend the growing season.

That said, Unilever explicitly recognised biodiversity priorities for farmland are very different in different parts of the world and provided some examples to illustrate this variety. The Parque Nacional de Doñana, west of Seville in Southern Spain, is an important wetland nature reserves and is also one of Europe's major areas of strawberry production. The cultivation of strawberries is dependent on irrigation and the farmers are effectively in competition with the nature reserve for water resources and Unilever have been involved in the search for a strategy that attempts to reconcile the competing interests. This has involved detailed recording of the annual pattern of water use to optimise its efficiency, and while there have been local political problems, best practice guidelines are now available for farmers.

In the Eastern Arc Mountains of South West Tanzania, the Mufindi Forest stands high above over 300 small tea gardens that make up the Lipton's Tea Estate. Although some forest clearing has taken place in the past, the remaining forested area provides an important habitat for a number of rare, and some unique, species of animals and plants and is considered to be a valuable biodiversity hot spot. There is an important relationship between the upland forest and the lower tea estate in that the forest helps to minimise erosion on the slopes which run down to the tea estate and to maintain the microclimate and the water supply needed by the crop and during the dry season the estate is irrigated using harvested rainwater. Liptons have partnered with the Tanzanian Forest Conservation Group on conservation projects and new tree planting, and to recognise, and assess, forest disturbance and more generally to develop awareness of ecology. The overall focus is to support the development of local communities and to reduce the pressure on the forest to help to maintain the relationship between the natural environment and commercial agriculture.

Steinicke, based in Wendland, is one of Germany's leading producers of herbs and dried vegetables and supplies Unilever with chives, parsley, carrots, celeriac and leeks. The Wendland area of Lower Saxony is relatively sparsely populated and provides seasonal habitats for a range of migratory birds and for a number of endangered species including otter, beaver and common crane. The farmers who supply Steinicke have looked to modify their cultivation methods to accommodate the wildlife and conservation interests by not growing produce on wetlands, by mowing meadows just once each year, planting hedges, and providing nesting boxes and bird hides. Frigamo is the largest supplier of frozen and dried potatoes in Switzerland and all the farmers that supply Unilever are around the small town of Creasier in Neuchatel. Here farmers have established important habitats for storks, swallows and wild bees, by maintaining fallow land, hedges, fruit trees and flower stripes and have also modified their cultivation practices to take into account the breeding times of birds.

Nestlé

Nestlé outlined its approach to biodiversity and ecosystem services as part of its commitment to natural capital. As such, Nestlé (2020a) described natural capital as 'the sum total of nature's resources and services, and the basis upon which economic activity is built' and identified biodiversity and ecosystem services, along with inert resources, such as fossil fuels, as the three constituent elements of natural capital. The company emphasised that its long term success is dependent upon the products and services provided by natural capital. Nestlé, is a large user of agricultural products and acknowledged that many agricultural practices can make a major contribution to the loss of natural capital through the conversion of forests, grassland and wetlands, heavy reliance on chemical fertilisers and pesticides, water extraction and soil erosion and degradation. In addition, Nestlé uses seafood from the oceans and across the world it operates from over 460 factories, some of which are in areas that exhibit high levels of biodiversity. Further, the company argued that its rural factories have a role to play, as protecting and enhancing natural capital is an essential element of strengthening rural development.

Nestlé is committed to develop its business in a way that safeguards natural capital, and in particular biodiversity and ecosystem services. More specifically, the company claimed that this commitment is embedded into its corporate business principles, its supplier code, and its commitments to sustainable sourcing for forest based materials and water use in agriculture. More specifically, Nestlé (2020a) made four sets of commitments, namely to 'act as a responsible steward of natural capital'; 'report on risks and responses'; 'support consumers to make better-informed choices'; and 'work with stakeholders.' In acting as a responsible steward, for example. the company looked to ensure that its operations maintain or enhance high conservation values in areas where its operations are located in or dependent on, and that it provides guidance to farmers on sustainable agricultural practices designed to manage and conserve water and soil, to conserve and restore biodiversity, and to reduce discharges and wastage. In supporting consumers to name more informed choices, one focus is on engaging with local communities on projects to enhance biodiversity values, as part of the company's community engagement strategy.

The company has reported on its delivery of a number of its commitments to biodiversity and ecosystem services in its 2019 'Progress Report' on 'Creating Shared Value' (Nestlé 2013). In outlining its actions on climate change, for example, while the company reported on its headline goal to achieve net zero greenhouse gas emissions by 2050, it also emphasised that developing agricultural initiatives for carbon storage, reforestation and biodiversity protection, were vital elements in meeting this goal. In its goal to safeguard the environment the company stressed its commitment to protect natural resources and biodiversity and to minimise its environmental impact. The company also reported on working with industry partners to address biodiversity loss and to achieve deforestation-free supply chains. More generally, Nestlé reported on its determination to demonstrate leadership in biodiversity protection and on its plans to accelerate transformational change in food and agriculture systems to protect biodiversity for the benefit of people and planet alike' (Nestlé 2020a). Biodiversity is one of the 4 categories listed under the heading of environmental sustainability in Nestlé schedule of Key Performance Indicators in its progress report on shared value. Here the indicator was the total size of manufacturing plants located in protected areas, and while the data was published for 2018, the company has discontinued publishing the information because it was no longer seen as a materially important way to communicate the company's dependency and impact on biodiversity.

Dow Chemical Company

In addressing 'Valuing Ecosystems', the Dow Chemical Company (2015) emphasised that it 'appreciates nature for its intrinsic value and also recognizes its dependency on the critical services nature provides.' The company argued that while 'ecosystem services are too frequently taken for granted, nature provides a variety of valuable services to individuals, communities and businesses' (Dow Chemical Company 2015). While the company acknowledged that the benefits of ecosystem services are complex, it also reported its commitment to 'incorporating their value into business decisions' (Dow Chemical Company 2015). More specifically the Dow Chemical Company reported on a number of initiatives designed to incorporate the value of nature into its operations.

In the mid 1990s at the company's Seadrift Operations site in Texas was looking to expand its water treatment capacity but decided to adopt a natural technology approach rather than to build a conventional wastewater treatment plant. The company's approach was to construct a wetland designed to treat wastewater in a natural setting. Further the company reported that it would save an estimated \$282 million in present net value over the expected lifetime of the facility. In an attempt to encourage the more widespread introduction the company undertook an analysis to compare the economic and environmental impact of the two options, which suggested that the lower energy and material inputs to the wetland treatment facility resulted in lower potential impacts for fossil fuels and ozone depletion and were likely to lead to lower potential impact for global warming and marine eutrophication. More generally, the company claimed their analysis gave a lie to the conventional wisdom that green infrastructure always requires a greater land area its physical counterpart.

In a joint initiative with The Nature Conservancy, a global environmental non-profit organisation, the Dow Chemical Company launched an initiative designed to

incorporate the value of nature into business decisions, and more particularly to develop and apply methods to evaluate the benefits from nature, and to create a strategic way for companies to assess, incorporate and to invest in nature. The first of two pilot schemes at Freeport in Texas, US, focused on three ecosystem services, namely improving air quality through reforestation, mitigating coastal hazards with natural infrastructure, and preventing disruption to freshwater supply. Here the company reported that the most promising results suggested that large scale reforestation could improve air quality. The second pilot scheme at Santa Vitoria in Brazil, looked to expand agricultural production, while minimising the environmental impact and maximising ecosystem services, while also complying with the country's Forest Code, which was designed to protect rivers, soils and forests on privately owned land. This pilot scheme identified areas best for promoting biodiversity or preserving water quality.

The joint initiative also included a number of other projects. An 'Ecosystem Services Identification and Inventory' (Dow Chemical Company 2015) tool was developed to provide rapid assessment of ecosystem services at a site level, and the aim here was to enable businesses to rapidly identify, characterise ecosystem services and to estimate their value, to businesses, and the public, from the land on, or adjacent to, their sites. In a similar vein, the 'Biodiversity and Ecosystem Services Trends and Conditions Assessment Tool' (Dow Chemical Company 2015) provides businesses with open access to global data and a user interface that enables them to measure, compare and prioritise current, and future asset portfolios in terms of biodiversity and ecosystem services.

More generally, the Dow Chemical Company claimed a strong philanthropic tradition of supporting nature conservation. At the company's Riverside site, at Peverly, Missouri, US, for example, the company reported a strong commitment of support for habitat preservation and water conservation and at Pittsburg, California, US, the company has supported the improvement and upkeep of an important area of wetland. Here, the Dow Wetlands Preserve, an area of 188 hectares, includes 70 hectares of freshwater and brackish tidal marsh, as well as a beaver pond, freshwater ponds, open waters, mudflats, riparian zones and grassland. The wetland provides a habitat for a variety of endangered animal and plant species including the salt marsh harvest mouse, the black shouldered kite and the northern harrier.

Oil and Gas Industry Associations

IPIECA, the global oil and gas for advancing environmental and social performance and IOGP, the international association of oil and gas producers, have produced a guidance document on 'Biodiversity and Ecosystem fundamentals' (IPIECA and IOGP 2016). The guidance looks to link strategic development on biodiversity and ecological services and decision making at the corporate level and sets out a framework of six management practices. These practices cover building biodiversity and ecosystem services into governance and business processes; engage with stakeholders and understanding their expectations; understanding baselines; assessing dependencies and impacts; mitigating and managing the impacts and opportunities; and selecting, measuring and reporting on performance indicators.

By way of introduction, the two associations emphasised the widespread recognition of effective biodiversity and ecosystem services performance within the oil and gas industry. More specifically the associations suggested that biodiversity and

ecosystem services can be vitally important in meeting stakeholder expectations, avoiding costly design and project delays, maintaining licence to operate and in generating new business opportunities. The guidance recognises that oil and gas exploration, development and production can impact on the biodiversity and natural resources on which local communities depend and that the industry's operations may also depend on ecosystem services provided by the natural environment such as freshwater supply or coastal storm surge protection. These dependencies and the need to manage risk are seen to be important factors both at appropriate spatial scales and across the life cycle of industry assets. The two associations offer guidance at six stages of the asset lifecycle and two of them are illustrated here, namely engaging stakeholders and managing impacts and opportunities.

Stakeholder engagement is seen as an ongoing opportunity through which companies communicate with, learn from, and respond to, their stakeholders and it enhances the companies' understanding of stakeholders' expectations about biodiversity and ecosystem services, and provides a forum for communicating company performance. Further, engagement with stakeholders is seen to be important in helping to understand how local communities value and use natural resources, such as fishing grounds, and water resources, on which a company's operations may depend and how a company's operations may affect the quantity, and quality of, and access to such resources. The two associations referenced more detailed guidance by project phase and habitat type and also outlined how stakeholder engagement can be used to supplement and ground truth information from desk top studies on the provisioning, regulating and cultural dimensions of ecosystem services.

The importance of stakeholder engagement is illustrated with reference to Exxon Mobil's work in piloting improved communications on Alaska's North Slope. Here subsistence whaling is arguably the most important and culturally significant activity for the indigenous communities and whaling can occur in close proximity to the marine activities undertaken by the oil and gas industry and by large ocean cruising ships. Exxon Mobil, along with other oil and gas companies has voluntarily participated in an annual conflict avoidance agreement with indigenous whaling communities, which outlined protocols, for example, on the timing, location and speed of vessels, and which also funded dedicated communication centres, which used very high frequency radio to communicate with industry vessels, whaling crews and coastal stations.

The management and mitigation of impacts and their related risks is seen to be central in reducing biodiversity and ecosystem risks to projects and operations within the oil and gas industry and can also identify opportunities to improve biodiversity and ecosystem services through restoration and enhancement activities. The guidance document emphasized that 'the mitigation hierarchy is a central approach to managing biodiversity and ecosystem services' for a variety of reasons. It is seen, for example, to reduce ecological, economic, regulatory and reputational risks and costs, to facilitate the early identification of risk management options and additional conservation actions, and as an organising framework, it can provide a simple central planning reference, a platform to engage stakeholders and a stimulus for performance measurement. Ultimately, the goal of the mitigation hierarchy is seen to be protect biodiversity and ecosystem services and the guidance document identified two acceptable scenarios in any development namely 'no net loss' and 'net

gain' (IPIECA and IOGP 2016). In the former, there should be no overall reduction in either the diversity within, or among, species and ecosystems, or in their ability to deliver valued ecosystem services. In the latter, the focus is on leaving an overall positive legacy. That said, exactly how such targets should be measured and monitored is a matter of ongoing debate within the industry.

The two associations illustrated the industry's approach to the management and mitigation of biodiversity and ecosystem services with reference to PERU LNG. Here the company faced the challenges of managing a wide range of sensitive biodiversity and ecosystem services across very varied physical environments, including the upper montane forests of the Amazon headwaters, the Andes, and the Peruvian desert, for a natural gas pipeline, which ran to a liquefaction plant on the shores of the Pacific Ocean. The company developed an approach to biodiversity and ecosystem services which reflected the diversity of the landscapes and topography along the pipeline's route. The company claimed that their approach allowed it to manage biodiversity and ecosystem services at meaningful scales, with actions that were seen to be in harmony with the ecology and geography of the varied landscapes.

Concluding Reflections

The four cameo case studies provide a variety of illustrations of the approaches to ecosystem services and biodiversity in the corporate world. On the one hand, the cameo case studies reveal corporate recognition that ecosystem services and biodiversity underpin many business operations and that they are essential to long term business survival and, arguably more contentiously, to continuing growth. On the other hand, there was also an awareness of the potentially damaging impact businesses can have on ecosystem services and biodiversity and many of the conservation activities pursued by companies can be interpreted as acknowledgement of the need to mitigate and manage such impacts. At the same time, many of the ecosystem services and biodiversity projects outlined in the cameo case studies brought operational and financial benefits to the companies that pursued them. More widely, the majority of large businesses have developed sustainability and corporate responsibility strategies which outline their general commitment to the environment, and here there are often specific commitments to biodiversity and to preserving the natural integrity of ecosystems. That said, two wider, and partly interlinked sets of issues, namely shared value and equity, and the measurement and valuation merit reflection and discussion.

Firstly, Schröter et al. (2014) argued that while the concept of ecosystem services 'has gained considerable interest inside and outside of science, it is increasingly contested', and that it 'promotes an exploitative human–nature relationship.' On the one hand, in many ways the cameo case studies reflect the concept of shared value. The concept of shared value was defined by Porter and Kramer (2011) as 'corporate policies and practices that enhance the competitiveness of the company while simultaneously advancing social and economic conditions in the communities in which it sells and operates.' Indeed, Nestlé (2020b), one of the companies featured in the cameo cases, claimed that 'creating shared value is fundamental to how we do business.'

While this suggests a win-win situation, there are counter arguments. Crane et al. (2014), for example, identified a number of weaknesses and shortcomings in the shared value model. More specifically, they argued that the model is 'naïve about the challenges of business compliance', and that 'many corporate decisions related to social and environmental problems, however creative the decision maker may be, do not present themselves as potential win-wins, but rather manifest themselves in terms of dilemmas.' Further Crane et al. (2014) suggested that such dilemmas are effectively 'continuous struggles between corporations and their stakeholders over limited resources and recognition.'

These contrasting positions are also linked to the issue of equity, which ideally should embrace processes to allow the participation of all stakeholders in decision making and the sharing of benefits amongst all stakeholders. Here the development of ecosystem services may be seen to disadvantage certain groups and this may be a particular problem, in less developed countries, when, vulnerable groups are not genuinely engaged in decision making over a scheme which requires indigenous communities to change their land use location or method of cultivation. That said, such concerns are not confined to the less developed world and in focusing on social equity and ecosystem services in England, Mullin et al. (2017), for example, argued that 'where landscape change or management intervention reveals likely change in ecosystem service provision, the social groups that are winners or losers should be identified.'

Secondly there are the thorny issues of measurement and valuation. Reyers et al. (2013), for example, claimed that despite growing interest in ecosystem services, 'it remains unclear how ecosystem services – and particularly changes in those services – should be measured' not least because, 'the social and ecological factors, and their interactions, that create and alter ecosystem services are inherently complex.' In a similar vein, there are major problems in looking to measure biodiversity, not least in that it is a complex concept which cannot be fully captured in numerical terms, or in ways that can be understood by all stakeholders or meaningfully employed by policy makers.

In many ways, looking quantify the value of ecosystem services is an even thornier, and fiercely contested, issue. In drawing attention to the increasing interest in the economic valuation of ecosystem services and biodiversity, Atkinson et al. (2012) recognised that the 'growing recognition that the benefits and opportunity costs associated with such services are frequently given cursory consideration in policy analyses or even completely ignored' and that 'the valuation of biodiversity and ecosystem services is therefore increasingly seen as a crucial element of robust decision making.' However, a number of arguments have been mounted against the valuation of ecological systems. There are arguments, for example, that putting a monetary value on biodiversity implies that it can be divided up into smaller parts and about the difficulties of valuing an asset when its true value is as part of a coherent whole. At the same time there are concerns that different stakeholders may view the price of ecosystem services and biodiversity very differently and that putting a widely agreed price on cultural ecosystem services, such as spiritual sustenance and a sense of place, may be an elusive task.

There are also concerns that the economic valuation of ecosystem services and biodiversity is 'likely to pave the way for the commodification of ecosystem services

with potentially counterproductive effects for biodiversity conservation and equity of access to ecosystem services benefits' (Gomez-Baggethun and Perez 2011). More politically Robertson (2011) claimed that 'the development of markets in water quality, biodiversity and carbon sequestration signals a new intensification and financialisation in the encounter between nature and late capitalism.' Further, Robertson (2011) argued that 'the commodification of such ecosystem services 'is not merely an expansion of capital toward the acquisition or industrialisation of new resources, but the making of a new social world comparable to the transformation by which individual human labours became social labour under capitalism.'

Finally, and by way of a more balanced conclusion, businesses will argue that they have to make decisions about the natural environment, ecosystem services and biodiversity as an integral part of their business activities and those decisions will often involve making difficult choices and in so doing they will draw on economics in examining how to utilise natural resources that have alternative uses. At the same time, those environmentalists who see 'natural capital as primary and sacrosanct' (Read and Scott Catto 2014), will rail against framing ecosystem services and biodiversity in financial and economic terms. Well over a century later, and in a rather different context, the words of Oscar Wilde (1891), 'nowadays people know the price of everything and the value of nothing' still seem to resonate.

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Chinese Foreign Direct Investments in Germany: Impact on Company-specific factors and the development of the investment target

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Abstract

Chinese Foreign Direct Investments in Germany have been discussed controversially in German Mass Media. Based on the analysis of previous studies and literature review this paper attempts to gain an insight-view on the real situation in German companies after a takeover by a Chinese investor. The lead research question is: „What impact does Chinese direct investment have on company-specific factors and the development of the German investment target?“ A qualitative approach is applied by conducting expert interviews in companies concerned. The results are interesting and promising too, all companies have described their previous cooperation with the Chinese investor as positive and a win-win situation and expect it to continue in the future.

Keywords: FDI, China, Germany, M&A

Introduction

Headlines in the German press nowadays could give the impression that China is pursuing a kind of conquest strategy of the German economy (e.g. Welt, 2017; Manager Magazin, 2013). Takeovers such as those of the German robot manufacturer KUKA or the Bosch Starter Division by Chinese companies have recently generated considerable media interest in business, politics and society (Manager Magazin, 2017). Europeans are increasingly seeing their economic family silver flogged to Asia. Discussions are also being held in political circles not only in the USA as to whether and, if so, how forward-looking technologies or sectors of increased interest for internal security or similar things should and must be protected from being sold out to China. After all, many Chinese companies are suspected of buying up foreign companies only on the basis of their know-how (Zeit, 2017). From the point of view of the employee circles and employee representatives, there are always fears of emigrating jobs, or even of whole sites or company closures, as soon as the know-how has been transferred to the Far East. In addition, many attest to the Chinese a methodical approach that follows a state-initiated plan (Welt, 2017). There seems to be a common fear that the Chinese acquisition waves will increasingly undermine the German economy and that Germany could lose its competitive advantage "knowledge" to Chinese competition. However, most of the discussions are confined to the possible

economic effects of this "takeover wave". However, the impact of a Chinese direct investment on the affected companies has so far only been addressed and discussed in a few studies.

Objectives

Consequently, this paper is intended to provide an answer to the question of how Chinese direct investment affects company-specific factors and the development of the German investment object.

The few studies that have so far dealt with this topic at the corporate level have different structures (e. g. Golinski et al, 2016; Jungbluth, 2014; Bollhorn, 2015; Emons, 2015; Britzelmaier et al, 2017). Some based on qualitative approaches, others on quantitative approaches or a mixed approach, while others only discussed individual examples. Moreover, the same topics were rarely addressed by several studies. In addition, the studies show a heterogeneous field of results and there are obviously contradictions between the studies. Finally, the age of some publications can be seen as a problem, since the form and expression of the effects may have changed in the meantime. Building on these facts, our paper aims to review, update and refine the previous theses and results of the published studies. Furthermore, contradictions should be eliminated as far as possible in order to provide potential target groups with a basis for further research or decisions. In addition, the main objective is to identify and illustrate inductive factors, which have not been included in any of the studies so far, in order to be able to discuss possible new areas of impact.

Literature review

Today, China is one of the world's largest economies, due to the wonder of growth it has experienced over the past four decades (Zhang and Chang, 2016). The average annual GDP (gross domestic product) growth rate between 1978 and 2015 was 9.72%. If one compares this with the global growth rate of 2.84%, it becomes clear how rapidly the Chinese economy has developed (UNCTAD, 2017).

China's joining the World Trade Organisation (WTO) and the announcement of the "Going Global" policy in 2001 have drastically changed the Chinese business world and had a decisive influence on the development of IFDI and OFDI.

In the tenth 5-year plan, the "Going Global" project was established and incentives were created to increase the OFDI flow of certain industries. In particular, activities supporting the export of Chinese raw materials, parts and machinery in heavy industry, such as textiles, machinery and electronic equipment in light industry should be rewarded with export tax rebates, direct financial assistance and foreign currency support (Buckley, 2010).

The flow of Chinese outward foreign direct investment has developed rapidly in the period following WTO membership. The annual OFDI flow has risen from USD 0.45 billion in 1986 to USD 132 billion in 2015. China ranks third in terms of annual outflow of direct investment worldwide after the USA and Japan (UNCTAD, 2017). According to estimates by the Mercator Institute for China Studies (MERICS) and the Rhodium Group, the OFDI flow approached USD 200 billion in 2016 and has once again made a significant leap forward (Hanemann and Huotari, 2017).

The first registered investment from China in Germany was recorded in 1995 (Schwarzer and Zuberer, 2016). In recent years, the business activities of Chinese investors in the EU have grown sharply. Germany, as one of the main target countries for Chinese investments, has recently experienced a strong wave of takeovers by companies from China. Despite the continued slowdown in economic growth since 2013, this does not deter the Chinese from making further investments (Otto and Heck, 2015). In 2016 alone, company takeovers in Germany increased by 74 % to a total of 68 acquisitions. Measured in terms of the number of transactions, Germany displaced Great Britain (47) for the first time from the first place of Chinese OFDIs. By 2015, there were still 40 transactions in Germany (Kron and Sun, 2017).

The available previous studies dealing with Chinese direct investment in Germany or Europe have been conducted using both quantitative and/or qualitative research approaches. In applying the quantitative research approach, secondary data was frequently used and analysed. The studies by Emons (2015) and Jungbluth (2016) refer to statistics from the Ministry of Commerce of the People's Republic of China (MOFCOM) or to figures from the United Nations Conference on Trade and Development (UNCTAD), but mostly in combination. It should be noted here that data from both institutions on the same aspects, such as the investment volumes of Chinese companies in Europe or Germany, the number of transactions, etc., differ greatly in some cases.

The existing studies must be separated into general and company-specific effects. Hanemann and Huotari (2017), for example, from the Mercator Institute for China Studies (MERICS) and the Rhodium Group, dealt with the general development. Among other things, they investigated the investment volume of Chinese companies in Germany and Europe, the investment targets and the preferred sectors of Chinese investors (Hanemann and Huotari, 2017). Their studies disregarded company-specific effects. Various management consulting and auditing companies such as EY or PWC also analysed the development of the investment volume with regard to Chinese companies in Europe and Germany, e.g. Kron and Sun (2017) or Otto (2013).

Other important studies on this subject are the ones of Sohn et al (2009), Britzelmaier et al (2017), Knoerich (2010), Bollhorn (2015) and the meta-study by Franz et al (2016).

Research Questions and Research Design

Based on the research results of existing studies and literature, various research gaps could be determined and the need for further in-depth research was identified. In total, ten studies (two of the ten are taken from a collective work) could be identified, which dealt more closely with the effects of Chinese direct investments on a company-specific level. Further studies have addressed on the macroeconomic impact of investments in China. Since this work focuses on the effect on individual German companies, the results of these studies were omitted.

The empirical studies analysed on Chinese direct investments in Germany show that several different insights have already been found in various thematic aspects. From these, six different categories (Management, company structure, employees, company culture, financial aspects, synergies) could be derived, in which the majority of these studies focused on. However, it became clear that not every publication covered all

categories. In addition, there are significant differences in the depth with which certain aspects of the topic were dealt with. The studies examined here showed that some of the results are already relatively out-dated and may no longer reflect current reality. If one were to focus only on studies that are not older than five years, for example, the number of existing studies would be significantly reduced. This shows that, in this respect, there is a further need for additional studies to be carried out in order to highlight the relevance of this issue. Although only a small number of studies on this subject have been carried out so far, it has been possible to establish that there are sometimes considerable contradictions between the research results analysed. There is therefore a specific research gap in this respect, since certain findings cannot be based on a broad basis. Furthermore, it cannot be ruled out that the categories analysed so far, which were derived from the studies and on which effects could be determined, are definitive. In this respect, this may mean that there is a research gap in that no other factors have been identified or taken into account to date.

In summary, it can be said that studies published to date on the effects of Chinese direct investment in Germany have not yet made it possible to build a kind of theory upon it as to how they affected German companies. The low number of studies, with results that are sometimes controversial and out-of-date, and the lack of depth with which certain aspects were analysed, make this much more difficult.

Out of study's and literature review the following research question was conceived:
What impact does Chinese direct investment have on company-specific factors and the development of the German investment object?

The main objective of this research work is to find an answer to this research question and to close existing research gaps as a secondary objective. The aim is to find out whether the prevailing opinions and points of criticism, as well as the findings of other studies, are correct and whether Chinese direct investment is dangerous or rather beneficial for German companies. The results of this elaboration can be useful for various target groups. For example, companies should then be able to form a neutral picture of whether they want to consider a Chinese investor. Politicians could then be able to decide whether more restrictions would be recommendable for Chinese investors or whether it would be advantageous to further liberalise existing laws. On the one hand, this work aims to bring current research findings up to date.

One method of doing qualitative studies is to conduct an expert interview in the form of a guideline, so-called semi-structured interviews, as in the study presented here. The aim of this is to obtain a broad spectrum of answers to selected topics by answering questions that are as open as possible. Ideally, in the subsequent analysis, correlations can be identified without having guided the interviewees in a specific direction by means of possible answers, so that the best possible objectivity is guaranteed.

Out of existing studies and literature a category-based interview-guideline was developed and tested. Target companies were identified and contacted. Eight interviews could be conducted. Out of the analysis of the transcripts findings could be derived.

Findings

The most important findings could be derived in the categories „management“, „company structure“, „employees“, „company culture“, „finance“ and „synergies“.

Contrary to the findings of previous studies, an exchange of management is not uncommon as a result of the takeover. The introduction of a dual management system, consisting of a Chinese and a German managing director, is also common practice. As far as the decision-making power is concerned, it has been shown that this remains to a large extent within the German company, both operationally and strategically, which is often due to a solid basis of trust or depends on the company's results. In the case of strategic decisions, however, investors are more likely to interfere, but only in the form of coordination and exchange.

In terms of company structure the aspect of location and job security was looked at in more detail and it became clear that most companies have either a direct (contract) or indirect protection, the latter predominating. An indirect safeguarding of the location is assumed by the investor's investments in the German location, since a rational behaving investor would not voluntarily invest money to close the location afterwards. In the course of this process, it was also found that the majority of Chinese investors are investing in expansion or modernization projects.

On the one hand, it turned out that the number of employees in the acquired companies tended to increase over the long term. On the other hand, it was discovered that as a rule there are no salary changes, but that there is still an orientation towards current industrial or standard wages.

Cultural conspicuities were generally determined, which arise due to different understandings or opinions. The indirect expression of the Chinese poses a particular problem, which can lead to the loss of face of the other person in case of disregard. Image effects are another soft factor. Here, it was possible to observe changes in the behaviour of various interest groups of the German company as a result of the Chinese takeover, which are often only of a short-term nature. These include, on the one hand, negative image effects such as employee fears about job losses or customer fears about poorer product quality. On the other hand, positive effects, such as an increase in the number of applicants or the rescue of the location could be recognised.

Financial parameters are another issue. It turned out that almost all companies experienced an improvement in their economic situation and corporate success. There could be a possible connection with the financial support that the majority of companies receive from the Chinese investor. On the whole, access to external funding, such as bank loans or promotional funds, seems to be worsening, as external lenders still often have reservations about Chinese investors. A new point gained from the survey material is the outflow of liquidity to China, e.g. in the form of dividends. However, no trend could be established on this point, as an outflow of liquidity could not be detected for some companies.

Synergies resulting from the acquisition were investigated. It was found that the Chinese investor extended access to the Chinese market, but also in part to international markets. As a result of the larger sales market, companies will be able to

obtain a better order situation and capacity utilization and will also be able to position themselves better in general. In addition to the sales market, synergies could also be identified in the procurement market. For example, a large number of companies gain access to the Chinese procurement market with the help of the investor. Cost advantages resulting from lower purchase prices can improve the competitiveness of companies. Synergies can also be observed in the area of know-how exchange, as some German companies benefit from an inflow of knowledge and technology from China. This is contrary to the general fear that Chinese investors only want to transfer know-how and technologies to China. An actual loss of know-how could only be ascertained in a few companies and if so, this was not regarded as negative. What is closely linked to the above-mentioned increase in knowledge from China is an increase in innovation capacity. This was found in a large part of the companies and resulted from increased expenditures and investments in R&D, which are supported by the investor. The capacity for innovation has not yet been examined in any studies. Nor was there any mention of a change in the product portfolio. The survey showed that the majority of the companies in the majority of the survey showed that the Chinese takeover led to a change in their product portfolio, mostly in the form of an expansion or broadening of the portfolio.

The assumption or fear circulating in media and political circles that Chinese takeovers only lead to a know-how drain, a reduction of jobs or the complete closure of locations could not be determined in this study. On the contrary, if you look at all the effects and findings, you can see that the positive aspects clearly outweigh the positive aspects and that the companies were able to benefit from the Chinese takeover. The result was a better economic and strategic positioning and a favourable starting position for future development. It is therefore not surprising that all companies have described their previous cooperation with the Chinese investor as positive and a win-win situation and expect it to continue in the future.

Conclusions and outlook

Our investigation revealed a picture that differed greatly from the reports of many media. The small number of interviews certainly does not lead to a representativeness of the results, but gives a first well-founded insight into the affected companies. A larger number of companies could be surveyed for further insights. The results of a broader qualitative investigation could then lead to a qualitative investigation that could falsify or verify the obtained findings in a statistically valid way. It would also be interesting to carry out country comparisons.

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Theoretical review on the implementation of IPSAS accrual basis and its benefits to the public sector

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Abstract

Governments need to publish high quality and transparent financial statements that are reliable and internationally recognized, by using International Public Sector Accounting Standards (IPSAS) or equivalent standards. This is a key feature of democratic responsibility, accountability and public reliability. On the other hand, it can be considered as an opportunity to prepare better management information for better decision-making, thereby contributing to better public service performance and sustainable public finances. However, the reform and transition toward accrual accounting and reporting in the public sector is considered as a complex process, which incorporates several factors influencing its outcome as challenges.

This paper as a theoretical review elaborates the main benefits of implementation of IPSAS accrual basis for public sector and analyses the current situation on IPSAS accrual basis implementation. By means of this research, the literature review of the publications on this topic, will nowadays define the benefits, current status, necessity and importance of IPSAS accrual basis implementation.

According to the conclusions of this research, the main benefits of the implementation of the IPSAS accrual principle will enhance transparency and accountability in public finances, will improve the reliability, quality and comparability of financial information, by enabling the consolidation of financial statements of the public sector, as well.

That is why objectives like enhancing fiscal discipline, adopting good public finance governance practices, transparent and quality financial statements, by applying unified chart of accounts for budgeting, execution and financial reporting, followed by processes of economic integration and globalization is considered beneficial for the gradual transition towards IPSAS accrual principle according to the conclusions of this research.

Keywords: Public sector, IPSAS accrual, IPSAS cash basis, transition, financial reporting,

1. Introduction

Because of increasing globalization, there is a need for a common economic language so that stakeholders around the world can communicate with each other. Accounting as a common economic language, is used by individual cultural groups and tailored to their needs to interpret the information obtained from the financial statements. In addition, Governments for the public sector also need to provide

reliable and detailed information on their financial position and performance, according to internationally recognized standards.

As is known, the public sector entities have traditionally used cash accounting. Since the 90's, government accounting has advanced in a way that significant supporters of the cash principle such as the International Federation of Accountants (IFAC), the European Union Commission (EU Commission), the International Monetary Fund (IMF), and the United Nations (UN) have entered into discussions on the need and benefits of changing accrual standards.

However, according to authors (Wynne, 2011; Adriana & Alexandra, 2006), the pressure on public sector financial reform, namely shift from cash accounting to accruals, originates from the International Monetary Fund (IMF), the World Bank (WB), The Organization for Economic Co-operation and Development (OECD) and the International Federation of Accountants (IFAC), which were the ones disseminating the idea of this reform.

The transition to the accrual principle that certain countries have begun, and are in the process of realising it within a certain timeframe will be mandatory for all EU countries. However, according to various authors who have reviewed and analysed it, there are several reasons and benefits of this financial management reform in the public sector.

The global financial crisis and the subsequent sovereign debt crisis have highlighted a lack of transparency in public finances, while poor public finance management could jeopardize governments' ability to serve public debt and meet their commitments of welfare and other public service delivery objectives. As a result, the recognition of the importance of accrual accounting and public sector financial management has been growing as a key means of achieving sustainable public finance.

The process of adopting a set of accounting standards, as part of the international convergence of financial reporting systems is perceived as a very important aspect of globalization of the world economy (AASB, 2002; Herz, 2007). For many years, accounting professionals, regulators, financial analysts, and investors have called for efforts to harmonize accounting standards across countries (Roje & Vašiček, 2008). The trend of international convergence and harmonization of private sector accounting policy and financial reporting standards has also influenced the entire public sector reform process that has progressed worldwide.

2. Review of Theory and Literature

Governments need to prepare and publish high quality and transparent financial statements that are reliable and internationally recognized, by using IPSASs or equivalent standards. This is a key feature of democratic responsibility, accountability and reliability towards the public.

On the other hand, it can be considered as an opportunity to prepare and publish quality management information for better decision-making by contributing to the better public service performance and sustainable public finances, as a strategic objective.

Accrual-based financial reporting standards have intended to capture the economic substance of transactions and events in accounts as they occur, regardless of the timing of cash receipts and payments. The accrual-based financial statements provide a comprehensive overview of the government's financial position and performance that is not simply available in the cash accounting system, which is the main weakness of IPSAS cash principle.

Even more, considerable literature has shown that government accounting reform, among other things, consists of introducing accrual accounting in government organizations (Lüder & Jones, 2003; Brusca & Candor, 2000).

Given the concept that information is being considered as the most important resource needed in the management process, a comprehensive accounting information system is crucial to the successful performance of public management (Vašiček, 2004).

Christensen (2002) considers that accrual-based financial reporting has been important among the accounting technologies that have dominated public sector management reforms.

The author Chan J. (2006) considers that the introduction of IPSAS came because of the dissemination of pressure to advance government accountability and financial transparency, as two of the most important elements of good governance that cannot be separated from one another. Other authors (Barrett, 2004) relate accountability to performance and responsibility. PricewaterhouseCoopers (2009) believes that the implementation of accrual IPSAS improves accountability and facilitates auditing of public institutions as well.

According to the IFAC study (Policy Position, 2012), accrual IPSAS will result in an important step towards achieving financial transparency of national governments globally. The study also highlights the need for Governments to undertake the necessary activities and enable the implementation of various institutional arrangements to enhance transparency and accountability in public sector financial management.

According to the publication of Ernst & Young (2013 EYGM Limited), the ongoing sovereign debt crisis in some countries around the world has demonstrated the challenges of maintaining financial stability in these governments. Many governments are exploring the adoption of accrual-based accounting frameworks in order to improve them, increase their decision-making ability in preventing and responding to these issues. Therefore, the application of International Public Sector Accounting Standards (IPSASs) based on accruals for the public sector is being considered as a defective framework for the public sector.

Price Water House Coopers (PwC) Global Survey (2015) concludes that governments need to establish and adopt sound and transparent accounting and reporting rules as part of the process of democratic accountability and broader public finance management.

Based on the conclusions of the study of the Federation of European Accounting Experts (FEE, 2017), respectively the Public Sector Committee, accrual accounting

facilitates better planning, financial management and decision-making in governance, it is also a robust and acceptable way of measuring the economy, efficiency and effectiveness of public policies. Furthermore, one of the objectives of financial reporting is to allow accurate comparisons among different organizations. Using the accrual basis for public financial statements, will result in the increase of the comparability of the public sector and private sector organizations, and maintaining the comparability of an individual organization over a period from a periodic basis.

A study of PwC (2013) on the implementation of accrual accounting in the public sector found that by reporting on their financial position and performance in a comprehensive and comparable manner, governments increase transparency and can be held accountable for the use of public funds. This transparency can be achieved through the harmonization of reporting practices and is necessary for the proper functioning of financial markets and budgetary oversight.

Based on the study by Ernst & Young (2017), the expected benefits of European Public Sector Accounting Standards (EPSAS) moving towards accrual accounting have been identified, as presented in the table below.

As shown in the table 1, the benefits are mainly related to public services, categorized by type and by the stakeholders involved.

The most important benefits derive from the first five types of long-term benefits: (i) transparency and comparability, (ii) fiscal harmonization and oversight, (iii) long-term fiscal outlook, (iv) accountability and (v) decision-making.

Figure 1: Economic benefits to stakeholders for a move towards accrual accounting in Europe

According to the same study (EY, 2017), the benefits from IPSAS accrual implementation mainly affect the following stakeholders: (i) policy makers, (ii) taxpayers and service beneficiaries, (iii) financial markets and rating agencies, and (iv) EU institutions and the national statistical offices.

European Commission Public Consultation Document (European Commission - Eurostat 2013), considers that the fundamental principles guiding the setting of standards and further approval enhance transparency by contributing to the quality and reliability of financial information and enhancing the credibility of financial statements, produced with due respect given these basic underpinnings.

Based on this document, the principles related to the EPSAS standards proposed in the Commission's Public Consultation Paper on governance include also reliability, relevance, coherence and comparability, accessibility and clarity.

2. Current Debate: 'Pro' Reasons for Accrual Accounting and Financial Reporting on Public Sector

The current debate over the issue of benefits on the transition from cash to accrual principle in the public sector is one of the topics considered nowadays as "new financial management", as a current topic worldwide.

Stakeholders	Ministry of Finance	Audit authorities	Public managers and non-financial staff	Policy-makers	Taxpayers and recipients of services	Media	Financial markets and rating agencies	EU institutions and national statistical offices	Others
Benefits									
Transparency and comparability	+	+	+	++	++	++	++	++	+
Harmonization and fiscal oversight		+	+	+	+	+	++	++	+
Long-term Fiscal Assessment	++	+	+	++	++	+	++	++	+
Accountability			++	++	++	++	+	+	
Decision-making	++		++	++	+	+	+	+	+
Cost accounting and performance measurement	++		++	+	+	+			
Best Reform Practices	+		+	+			+	+	+
Audit and internal control	+	+	++	+	+				
Administrative costs and burdens	++	+	+	+	+			+	+

Source: EY, Eurostat commissioned study on EPSAS, 2017, pg. 18

Although about half of governments still use traditional cash accounting practices, there is a positive trend: accounting system modernization reforms have been launched or planned worldwide, aiming to use accrual accounting within the next five or ten years, taking IPSAS (International Public Sector Accounting Standards) as a benchmark. This trend has been evident throughout the continents, based on the recent publication (IFAC, 2018).

However, switching to accrual accounting is not an objective in itself, but it is rather an important enabler for public finances. Accrual-based transparent financial statements reflect the true long-term implication of political decisions and therefore help governments demonstrate and assess accountability for the use of public funds.

The Association of Certified Accountants (ACCA, 2017) publication on the implementation of IPSAS, while describing the benefits of applying the IPSASs with

accrual principles, have also listed the following benefits: (a) greater accountability and transparency; (b) better decision-making; (c) improving efficiency; (d) consistency and application of data; (e) sound financial management; (f) professionalization and access to talent; (g) great economic and social advantages; (h) government stability; and (i) international comparability.

In addition, according to Ghent University's (2009) study of the effect of IPSAS on reforming financial systems, the 'pro' reasons for adopting IPSAS under the accrual principle listed: (a) improve external accountability and control, (b) provide more reliable capital markets information, (c) facilitate decision-making, (d) improve the asset management, etc.

According to PwC (2013), the key objectives of the EPSAS initiative and the most common types of benefits reported by Member States relate to the transparency and comparability of financial information produced by governments, followed by harmonization and fiscal oversight.

These two types of benefits are very closely linked to each other, as harmonization of policies at EU level will ensure consistency at Member State level, leading to comparability of financial information produced by individual reporting entities.

In addition, according to the PwC (2014) study commissioned by Eurostat on EPSAS, which summarizes the economic and social benefits of the implementation of the EPSAS, a list of benefits was identified and described as presented in the table below:

3. Status of the Accounting Principles and Financial Reporting in the Public Sector in the World

The latest study published by International Federation of Accountants (IFAC) and the Chartered Institute of Public Finance and Accountancy (CIPFA, 2018), 'The International Public Sector Accountability Index for 2018', taking into account 150 countries, addressed two main areas: (i) the current basis of financial reporting and (ii) financial reporting framework, and has reached the following conclusions about both the current situation and future expectations. The results of this study are also relevant to the conclusions of this paper, since they are in line with the results of our research.

Based on the study mentioned, regarding the current financial reporting basis, of the 150 countries analysed, it results that:

- 46 countries use the cash accounting principle,
- 67 countries are in the process of transition to accrual accounting, and
- 37 countries apply accrual accounting principle

Therefore, while only 25% of governments currently report on accrual basis, 65% of governments will report on accrual by the end of 2023. According to this study, Asia, Africa and Latin America Caribbean will lead projected growth until the end of 2023.

However, it is clear that the number of governments reporting on accrual basis will double it in the next five years. By the end of 2023, according to these plans, 98 governments (65% of the Index) will fully report on accrual basis.

Table 2: Economic and social benefits of the implementation of EPSAS

Economic effects	
Accountability transparency	and Transparency and comparability Harmonization and fiscal oversight Long-term fiscal evaluation Accountability
Better decision-making	Decision making Cost accounting and performance measurement Reform best practices
Effects on control administrative processes	and Audit and improve internal financial control Reduce administrative costs and burdens
Social effects	
Effects on the labour market	Qualification Recruitment and mobility

Source: PwC (2014), Collection of information related to the potential impact, including costs, of implementing accrual accounting in the public sector and technical analysis of the suitability of individual IPSAS standards.

According to the publication of the Public Sector International Financial Accountability Index for 2018, regarding the public financial reporting framework, they have been developed in a variety of ways, many of which use International Public Sector Accounting Standards. IPSAS provides high quality financial reporting guidance to governments and other public bodies around the world in order to improve their consistency and transparency. According to this report, 51% of governments currently reporting on an accrual basis uses IPSAS directly, indirectly or as a benchmark. By the end of 2023, nearly three-quarters (73%) of governments reporting accrual will use IPSAS in one of these three ways (IPSAS directly, indirectly or as a benchmark).

Regarding the financial reporting framework, the study also highlights that the situation is as follows:

- 70 countries use national financial reporting standards
- 33 states use national standards using IPSASs as a point of reference
- 2 states use national standards based on International Financial Reporting Standards (IFRSs)

- 14 states have indirectly adopted IPSAS through national standards, and
- 31 countries have directly adopted and use IPSAS

The report concludes that by providing a comprehensive overview of government finances: (a) accrual reporting helps ensure that public funds spending is transparent, (b) public officials are accountable and (c) future liabilities are formally recognized and properly planned.

Public Sector International Financial Accountability Index (2018) also highlights critical success factors for accrual reform projects, which are actually the main challenges as well. These factors include: (a) coordinated planning, (b) dedicated and supportive policy and senior policy-makers, (c) ongoing communications, (d) change management plan and effective training and (e) capacity building programmes.

Overall, plans for greater use of accrual reporting over the next five years are a promising sign for citizens across the globe. Financial statements under the accrual accounting and reporting principle, audited and linked to an inclusive budget are a key part of improving public financial management worldwide, which is essential to promoting trust and transparency and above all to provide the results that their citizens expect and deserve. Of course, challenges need to be addressed properly and timely, to assure smooth transition and successful implementation.

4. Conclusions and Findings

Undoubtedly, financial statements prepared on an accrual basis of accounting (IPSAS accrual) are useful both from the perspective of accountability and decision-making. Such financial statements enable users to: (a) evaluate the accountability of all the resources the entity controls and the commitment of those resources, and (b) evaluate the financial position, financial performance and cash flow of the entity. This is because accrual accounting provides information on the general financial position and the current position of assets and liabilities, on the one hand, and accrual accounting provides information on income and expenses, including the impact of transactions where cash has not been paid or received yet, on the other hand.

Every step away from the cash principle, however, imposes the need to rely on some valuations and professional judgments. The financial statements prepared on an accrual basis require the calculation and judgment in the valuation of assets and liabilities, including depreciation and provisions. Certainly, accrual-based financial statements require certain level of accounting skills to prepare and present them accordingly.

Furthermore, accrual-based financial statements are obviously complex and more difficult to understand, requiring consistent training programmes in interpreting financial statements according to accrual principle for lawmakers and decision makers. In this regard, this has been considered as a challenge itself, especially for the first time of adoption of standards.

The application of high quality accrual accounting also lays out the foundation for the development of better management information systems, which should contribute to better decision-making and better use of public money.

As a result, performance management should help governments measure the achievement of their service delivery objectives and thereby add value to citizens. The ultimate goal should be to provide better public service and achieve sustainable public finances, thus creating a positive legacy for the next generation.

To summarize, based on the analysis and evidences from international literature, publications and credible studies on the benefits of implementing the reform of the adoption of International Public Sector Accounting Standards with full accrual principles, despite major challenges identified, the adoption of IPSASs in principle accrual in financial reporting will have a positive impact and will result on public finances. It will enhance transparency and accountability in public finances; will improve the reliability, quality and comparability of financial information, by enabling the consolidation of financial statements of the public sector as well. Finally, preparation and publication of financial statements in full accordance with IPSAS accrual basis, enables financial statements to show the true financial position and economic performance of a country, in a complete and meaningful perspective.

In this way, it also contributes to build public confidence related to the information of economic, financial and sustainable macro-fiscal position. It also helps ensure better disclosure of financial information, improved accountability, transparency, and better financial management, better public finance information in the country for the donors and government technical assistance as well.

Additionally, this paper has also highlighted the necessity and importance of implementing public sector accounting and financial reporting reform (IPSAS accrual principle) by concluding that this reform will enable a modern financial management system, more efficient use of public funds and advanced public finance management. On this way, it contributes to economy, society and the research community on further analysis.

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Evaluation of Cheese Packaging Graphics Design Using Eye Tracking and Consumer Survey Research

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Abstract

Main objective of the research paper is to identify the most attractive parts and elements of packaging from consumer point of view based on assumption that package design and information on it play the important role in decision making process while people do shopping and consequently perceive and remember the most expressive product features. From consumer's point of view several aspects contribute to defining the quality of a food product, not only intrinsic qualities such as taste and other organoleptic properties, but also external factors such as origin and labelling (Grunert, 2002, Sadilek, 2019).

In our research we searched package of two kinds of cheese, both with very specific features. The package of the traditional cheese "Oštiepok" contained traditional ornamental design. The package of cheese "Bio Eidam" has been tailored for young generation due to its funny vector design. To evaluate packaging graphics design we collected data in two ways. In laboratory conditions we used Eye tracking research with a mobile Eye camera (Eye Tracker Glasses 2) with a dark pupil tracking technology from the Swedish company Tobii. To create heat maps, maps fixing points and evaluate different areas of interests (AOI) we used software Tobii Pro Lab (version 1.83.11324). Consequently, a consumer survey was carried out in the group of respondents. In total, 32 respondents – millennials participated in the research. Research results show the importance of the correct layout of text and graphics on the product packaging depending on marketing aims. Research work was supported by the Slovak Research and Development Agency on the basis of Contract no. APVV-16-0244 "Qualitative factors affecting the production and consumption of milk and cheese."

Keywords:

Product, consumer, eye tracking research, attractiveness, packaging

Introduction

The packaging plays a number of important functions. It was originally used to protect the product. Currently, one of the important functions is the transmission of specific messages to consumers, hence the packaging has become an important element of the marketing strategy (Gofman et. al 2009). From the marketing strategy point of view of, packaging is a tool of communication with the consumer. It plays the role of a medium (channel), providing it with knowledge about the type and content of the product, nutritional value, application, as well as the origin of the food product (Kotler & Keller 2006). All these elements are designed to attract the customer`s attention and encourage them to choose the product from many others on the shelves (Ruth 2009).

Many researchers emphasize the important relationship between packaging and buying decisions. It turns out that the impact of packaging on customer purchasing decisions is huge (Clement 2007; Young 2004; Underwood 2003; Hansen 2005, Moskowitz et. al. 2009, Gofman et. al. 2009). As experts emphasize, modern consumers pay attention to lively, persuasive colors, striking typeface, photography or illustration (Gofman et. al, 2009). According to Ares et. al (2010) well-designed packaging in many cases „have a higher impact on consumer`s decisions than the functional aspects of product“. Wang (2013) claims that food companies should put emphasis on visual packaging design factors, such as color, typeface, logo, graphics and size, to shape a positive consumer experience and develop specific brand preferences. According to a study by Westerman and others (2013) regarding design fo consumer packaging, consumers preferred rounded and upward-oriented shapes, as well as preferred label designs that placed graphics to the right of text. More detailed research conducted by Ampuero &Vila (2006) indicates that when it comes to more expensive products, consumers prefer cold and dark colors. As for low-price products, consumers pointed to bright colors, mainly white. The authors also found that on the packaging of more expensive products, photos with a given food product on the packaging were preferred, and cheaper counterparts contained photos of people on the packaging (Ampuero & Vila 2006).

The presented conclusions constitute a small part of the results of research conducted in this field. Undoubtedly, graphic design is one of the key issues of management and marketing decisions in many markets. Graphic design of packaging involves creating visual content to convey specific information to consumers. This information is provided, among others, through color packaging, typography, the graphical shapes and images (Moskowitz et al. 2009). Graphic designers use many visual tools to create specific impressions for the recipient of the message (Silayoi & Speece 2007). Keeping in mind that the content and graphic design of packaging are important in the purchasing process, it is necessary to properly design and choose colors, shape, size, etc. to correspond a message to the consumer (Clement 2007). The consumer must have the ability to properly decode the message contained on the packaging, so using messages that create common meanings for the sender and recipient is essential (Underwood 2003).

One of the methods used in the study of the impact of graphic design on consumer purchasing decisions is the eye-tracking method, introduced in the 1980s, initially used only in psychology and psychiatry. Currently, it is widely used in other areas of life, including marketing and management. Marketing research using eye-tracking

was conducted, among others by Gofman et. al (2009), Clement et. al (2007), Westerman et. al (2013), Oliveira et al. (2016), Hazuchova, Nagyová et. al (2018), Ares et. al (2013) and many others.

Methodology

Research was focused on consumer perception of extrinsic attributes such as product label, logo and packaging. Primary data were based on eyetracking research and complemented by questionnaire survey in order to identify consumer attitudes towards local products. In total, 32 respondents participated in the research. Research targeted Millennials (20 – 25 years) and sample comprised 59.4% females and 40.6% males living in both urban (34.4%) and rural (65.6%) areas.

Questionnaire survey

Each respondent fulfilled survey with several Likert type questions on a 10-points scale, where 1 meant extremely disagree and 10 extremely agree. Questions involved attitudes towards local products, products feature and visual attention of product packaging.

Eye tracking research

Eye tracking monitors the respondents' actual views of the examined objects; therefore, this method enables to identify interest in individual elements of the examined object or its surroundings. Furthermore, it allows to study respondents' reactions to external stimuli and reflects their perception of objects. Eye tracking research was performed by a mobile Eye camera (Eye Tracker Glasses 2) with a dark pupil tracking technology from the Swedish company Tobii with an accuracy of 0.5 to 1-degree angle, the update rate of 100 Hz, automatically calibrated at one point. We used also the software Tobii Pro Lab (version 1.83.11324) that records the progress of eye tracking and allows to create outputs such as heat maps, maps fixing points and AOI (Areas of Interests). The research was done in laboratory conditions using photography of the package of traditional Slovak cheese „Pološtiepok“ and „Bio Eidam“ (see Fig. 1) in format A4 that enabled sufficient visibility of all elements of the package.

Output of eye tracking research was graphically displayed in a form of heat maps. Heat maps are two-dimensional graphic representations of data where the values of a variable are depicted in colours. As almost all small and medium scale producers use very simple graphical design of packaging and with very basic information value, for eye-tracking research we used package of cheese “Pološtiepok” and “Bio Eidam” made by large-scale producer using good marketing practice to point at opportunities in the sphere of package graphical design.

Figure 1: Photographs of traditional Slovak cheese packaging

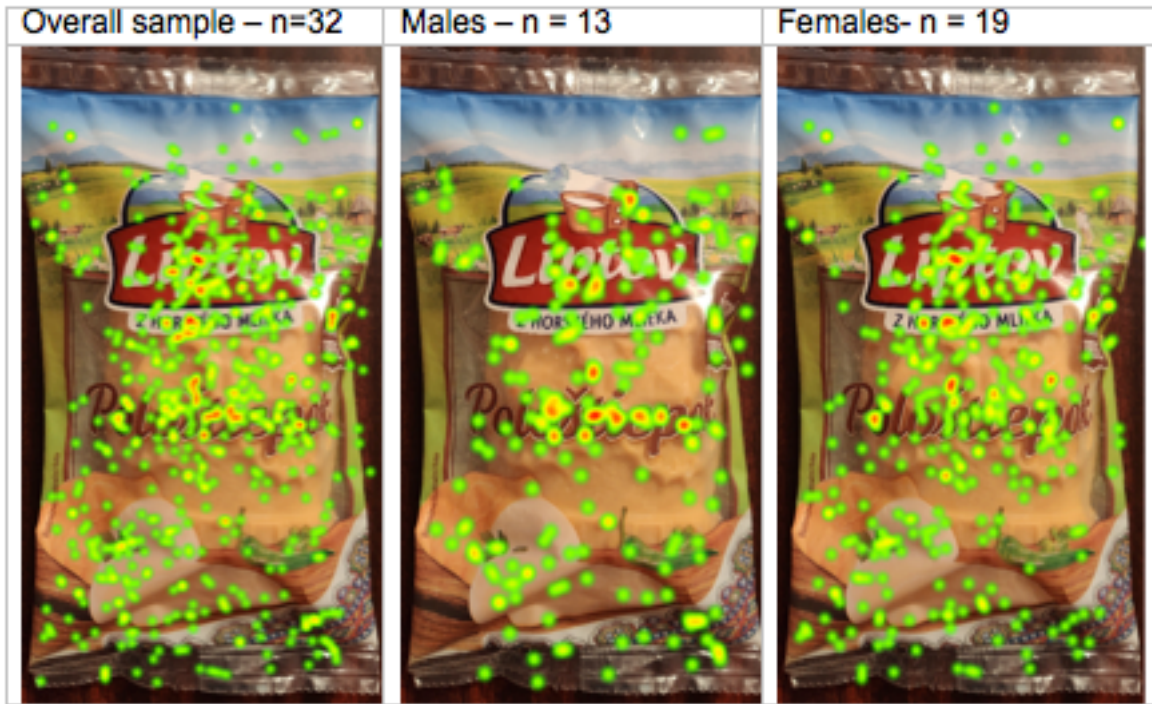


Source: own processing

Results and Discussion

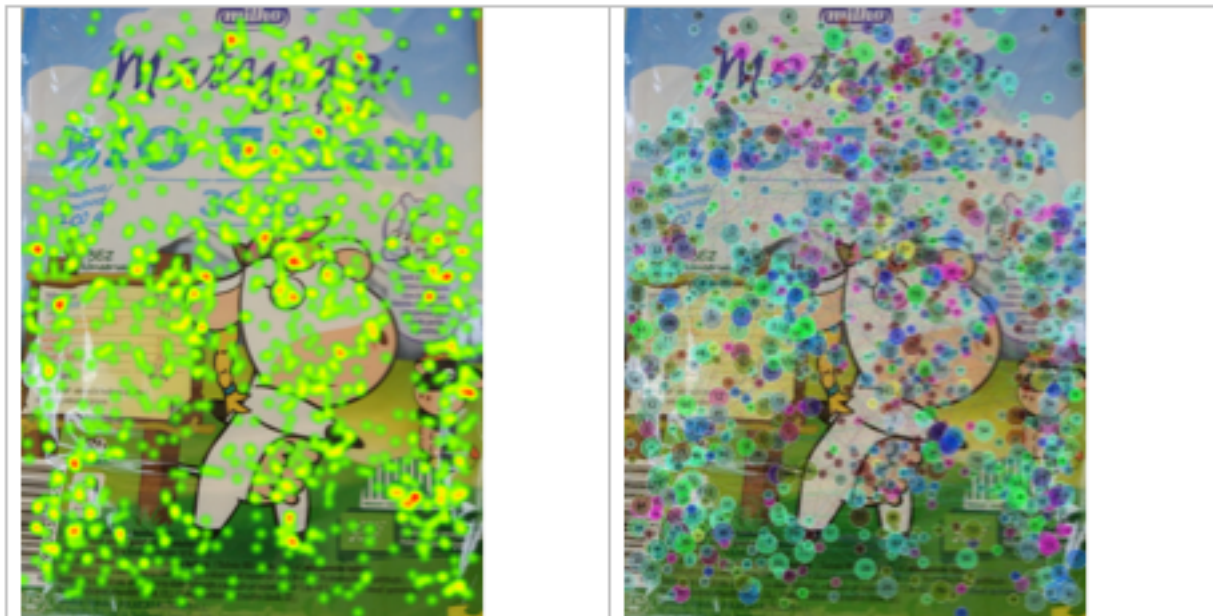
The results showed (Fig.2) that the highest attention was paid to the brand (Liptov), name of the cheese (Pološtiepok) and marketing information about milk used for cheese production (cheese was made from milk produced in mountain areas). These results are in alignment with the findings of the study which examined the chocolate packaging. The main attention was paid to a brand name and nutritional information and a product description (Gunaratne et al. 2019). When comparing heat maps based on gender, in female heat map dominated brand (Liptov) and the red graphic background. Colour played important role also in study conducted by Husić-Mehmedović et al., (2017) where consumer's attention was drawn by red, gold, green or blue colours and all of them were salient colours. In case of the male heatmap it was clearly the name of the cheese (Pološtiepok) followed by the brand (Liptov).

Figure 2: Heat maps: “Pološtiepok” packaging



Source: eyetracking research 2019

Figure 3: Heat map and fixation points: “Bio Eidam” package



Source: eyetracking research 2019

The second sample – bio cheese EIDAM is tailored made for kid’s market segment. This fact is visible from vector graphical design that remind us some funny or personalized picture of cow. Producer created also other versions of graphical design

of cheese package so child as a consumer can see the differences and create own imagination or story about the funny cow on the package. All these processes in consumer thinking are very important from viewpoint of educating loyal consumer for the future situations. Also heat map (see Figure 3) confirms that the most interesting part of the package is the vector of cow – especially her eyes and consequently the name of the product which is in this case also the name of the cow (Matylda). Thirdly, information about the product, some nutrition facts and logo referring to ecological production. In case of kid's graphical design we have to consider the fact that customer and consumer are two different person. As a customer we suppose a person, in many cases a mother, who takes care of family and her children. So, information about nutrition value and source of production is useful and important for customer's decision making process. Graphical design as it is tailored made for kids is important for consumer, a child, who finds a product in a refrigerator with interesting and funny features. This leads to emotional behaviour and helps mothers to offer healthy food.

In addition, questionnaire survey showed that respondents, on average, indicated that they agree with following statements: graphical design of the package is very important (8.4 points), each local producer should have logo of the company (7.9), big logo and brand name is the first that attract my attention (7.5) and I like traditional features on the packaging (7.1). Furthermore, they perceive local products as fresh (8.4), healthier (8.2) and products of high quality (8.3).

Conclusion

Findings of eye-tracker research allow us to emphasize the importance of information and esthetical side of the product package. Consumers search not only for brand name of the product but also type of the product, its specific features and origin of ingredients. Esthetical side of the design is also important but depends on its place on the package. Women are more sensitive towards using different colours on the package and information related to healthy lifestyle. However, with growing trend to consume healthy, local, fresh food and seeking authenticity among millennials, such information is becoming more important. Present study did not consider the generation effect, therefore it will be important to examined differences across generations in future studies.

Acknowledgement

Research work was supported by the Slovak Research and Development Agency on the basis of Contract no. APVV-16-0244 "Qualitative factors affecting the production and consumption of milk and cheese."

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