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ICT and e-Business Impact in the Glass, Ceramics & Cement Industry

**A Sectoral e-Business Watch study by
empirica GmbH**

Interim Report – Executive Summary

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About the Sectoral e-Business Watch and this report

The European Commission, Enterprise & Industry Directorate General, launched the Sectoral e-Business Watch (SeBW) in 2007 to study and assess the impact of ICT on enterprises, industries and the economy in general across different sectors of the economy in the enlarged European Union, EEA and Accession countries. SeBW continues the successful work of the *e-Business W@tch* which, since January 2002, has analysed e-business developments and impacts in manufacturing, construction, financial and service sectors. All results are available on the internet and can be accessed or ordered at the SeBW website (www.ebusiness-watch.org).

This is an interim report of a sector impact study, focusing on electronic business in the glass, ceramic and cement industry. The study describes how companies use ICT for conducting business, and, above all, assesses implications thereof for firms and for the industry as a whole. The findings are based on an international survey of enterprises on their ICT use, case studies and an econometric analysis of the ICT impact on productivity growth in the sector.

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Bonn / Brussels, February 2009

Executive Summary

About this study

This is the **interim report** of a study about information and communication technology (ICT) use and e-business in the glass, ceramics and cement (GCC) industries. The study objectives are to describe how companies in this industry use ICT for conducting business, to assess the economic impact of ICT for the sector as a whole, and to indicate possible implications for policy.

The study is based on **micro and macro-data**, primary and secondary sources (see [Section 1.4](#)). Micro-data about the e-business activity of firms have been collected through a representative IT decision-maker survey among 676 enterprises from six EU countries (see [Chapter 3](#)) and through case studies ([Chapter 4](#)). The macro-economic analysis is based on aggregate industry accounts extracted from the EU KLEMS growth and productivity accounts database ([Chapter 5](#)).

The sector at stake

The "GCC industries" as defined for this study refers to business activities specified in NACE Rev. 2 Division 23 as the "manufacture of **other non-metallic mineral products**". The study focuses on Groups 23.1 to 23.6, which broadly comprise the manufacture of glass, ceramics, cement, concrete, lime and plaster, and of products made of these materials. According to Eurostat, this sector¹ employed about 1.3 million² in the EU in 2005, comprised about 65,700 enterprises and generated a value added of about 62 billion euros across the EU-27 (see [Section 2.1](#)).

The GCC industries are a long-established, traditional manufacturing sector in the EU and an important **supplier to other industries**: the

sector produces raw materials and components for the building and construction industry, packaging solutions (container glass) for the consumer goods industry, and specific materials or components used –for example– in the aerospace, automobile, electronics and medical industries. The sector also produces **household goods** such as glass and ceramics tableware and cookware.

The EU still has a **trade surplus** in international trade in this sector. However, especially imports of flat and container glass have surged in the past five years, with China being a major competitor. The share and importance of international trade differs considerably between sub-sectors. In segments where transport costs are high in relation to product costs (which includes the cement industry and ceramics with lower value added such as bricks and roofing tiles), export quota are rather low (see [Section 2.1](#)).

The glass, ceramics and cement production have in common that non-metallic raw material inputs are blended before a heating process takes place to create these materials. This process of transforming is **energy intensive** and inevitably leads to significant carbon dioxide (CO₂) emissions. Coping with **environmental objectives**, in particular with the new greenhouse gas emissions regulation of the European Union, is a key issue and challenge for the sector's competitiveness ([Section 2.2](#)). In the glass and ceramics industries, the basic materials are further processed into a wide range of heterogeneous products. In the cement industry, the output is more homogeneous.

The 'e-Readiness' of companies

e-Readiness comprises three main dimensions which are discussed in this study: the technical **infrastructure**, a **skills** dimension, i.e. the availability of ICT skills (including ICT practitioners and user skills) in the company, and the **financial** dimension, i.e. the capacity and willingness to make investments in ICT (see [Section 3.1](#)).

¹ These figures are still based on the NACE Rev. 1.1 classification, Division 26 (whole sector).

² Employment statistics provided by the European industry federations of the GCC industry for their members tend to be lower than those in official statistics.

Technical infrastructure

Basic technical infrastructure is no longer the main barrier to use advanced forms of e-business. The diffusion of **broadband internet access**³ could actually be much higher than expected based on earlier studies. Even among small companies (with 10-49 employees), more than 80% said that they were connected with broadband; among medium-sized and large firms, broadband adoption has apparently reached levels of more than 90%. About 60% of all employees work in companies which enable employees to **remotely access** files on the company's computer network (e.g. from home or when travelling). However, these represent only about a third of all firms. Smaller companies from the chemical industry were slightly more advanced in this regard already two years ago (see Section 3.1.1).

e-Skills

With regard to e-skills (see Section 3.1.2), figures indicate that the vast majority of companies in the GCC industries is at least not directly affected by a possible shortage of **ICT practitioners** (i.e. staff with the specialised skills and tasks of planning, implementing and maintaining ICT infrastructure). It appears that this is more of an issue in the ICT industries themselves (e.g. for the large providers of e-business software).

Looking at **ICT user skills**, more than 50% of the survey respondents felt that the demands on employees regarding their computer and software skills "have noticeably increased" in the past few years. At the same time, however, a majority of the same interviewees also say that either no or only a few employees have problems in their job because of insufficient computer and software skills.

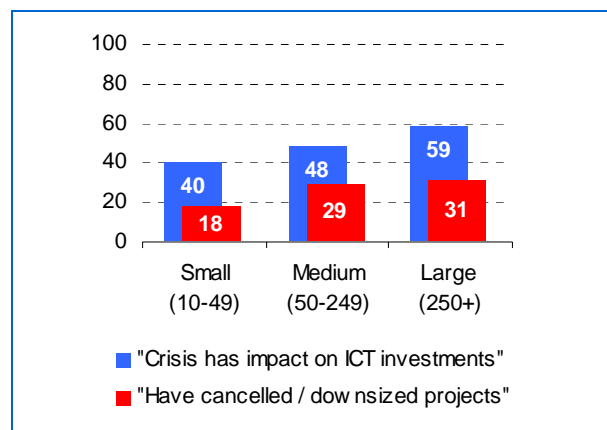
About 16% of the companies interviewed in 2009 said that they had **outsourced ICT functions** to external service providers which they had previously conducted in-house in the past 12 months (prior to the interview). A specific way of outsourcing is using "software as a service" (**SaaS**), which means that a software application is not purchased and

installed in the company, but made available (by the service provider) and used online based on a licence. It is anticipated that this model will rise in importance. Currently, about 20% of the companies in this sector said they made use of SaaS, according to the survey.

ICT expenditure

The general climate for **ICT investments** has significantly changed due to the economic crisis since late 2007 (see Section 3.1.3). Many large companies are cutting their ICT budgets or cancelling projects. In total, more than 40% of the GCC companies said that the crisis would affect their ICT investments; more than 20% had already downsized or cancelled existing projects (see Exhibit).

Impact of the economic crisis on ICT investments in the GCC industries (2009, % of firms)



On the other hand, the pressure to cut costs wherever possible can also have a leveraging effect on ICT use and e-business in some companies, if they see ICT as a means to achieve savings in a reasonably short period of time.

Asked about trends in their **ICT budgets**, 20% of GCC companies say that they planned to cut down on their budget, with only 10% planned to increase it. The others, in a majority (70%), say that the budget will remain about the same. This is the highest trend towards decreasing ICT budgets ever recorded by e-Business Watch (in any sector) since this type of survey was first conducted back in 2002.

³ defined as connections with an available bandwidth of at least 2 Megabit per second

'e-Activity': the digitisation of business processes

<The sections about electronic data exchanges with suppliers and customers (includes e-procurement, e-commerce, and related processes such as e-invoicing) will be developed in the final report. The main data (obtained from the survey) on these issues are already available in the Table Report. They will be analysed and be put into perspective in the report.>

The 'enabling role' of ICT for innovation processes

The **capability for innovation** is considered very important by European companies in the GCC industry in order to face global competition and to keep their position in higher market segments, which rely on differentiation and quality (ECORYS SCS Group, 2008a). This study explores in what ways and to what extent ICT enables innovation activities in the GCC industry.

Results broadly confirm the picture found in earlier years for most manufacturing industries. The majority of **process innovations** in the industry, according to the innovating companies, are linked in one way or the other with ICT usage, at least in larger companies. For product innovation, ICT matter as well, but to a lesser extent.

Companies representing more than half of the sector's employment said that they had introduced new or significantly improved internal processes in 2008/09. A majority of those (about 75%) said that the new process(es) were at least partly *supported by ICT*. Similarly, about 70% of the innovators said that ICT played –at least to some extent– a role in the *process design*, and had played a role in the *implementation* of the new process.

Case studies

This interim report features two case studies; 4-5 further case studies will be presented in the final report.

The two completed cases provide examples of the 'enabling role' of ICT and the strategic implications of e-business activity. They also document the diversity of companies and production methods in this sector: a global business based on highly automated production, and a niche-player with highly labour intensive production.



Case 1: Schott AG is a multinational technology-based manufacturer of glass and glass products for various industries. In 2003, the company implemented a new e-sourcing solution based on electronic Request-For-Quotations (**e-RFQs**) to support the worldwide sourcing of strategic goods and materials. The case study shows that e-sourcing in a large multinational company goes far beyond the implementation of electronic tendering tools. Schott also uses the solution to support collaboration between procurement, business and technical departments from the very beginning of the sourcing process, i.e. when the specification process starts. In 2008, Schott carried out about 1,700 electronic RFQs. Almost 900 internal users, more than 60 external engineering services as well as more than 4,200 suppliers and almost 2,000 additional document suppliers have used the platform.



Case 2: Gmundner Keramik is a manufacturer of (handmade) ceramics table and ornamental ware in Austria. For decades, the company used to produce on stock. However, as it was impossible to precisely anticipate the demand for specific designs and items, this procedure was inevitably inefficient. This case study shows how a technologically simple, self-programmed **production planning system** (based on a widely used, standard database software) has enabled the company to move from on-stock to order-based production, with a huge positive impact on process efficiency and reduced demand for storage capacity. The case demonstrates that "ICT-enabled" does not necessarily imply major investments in hardware or software; a very important observation for the macro-economic analysis of ICT impact.

The macro-economic impact of ICT and e-Business

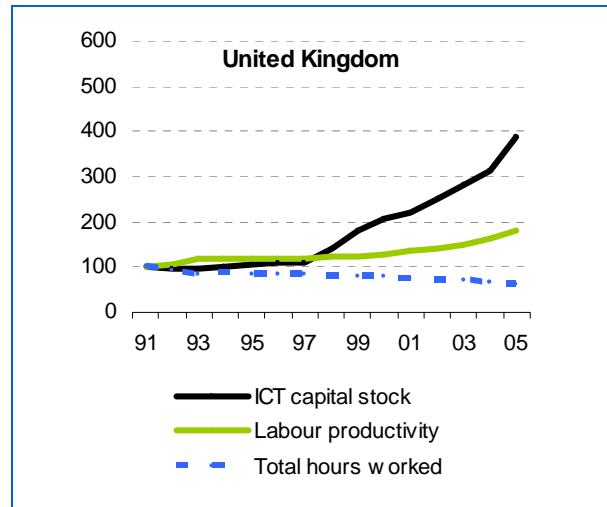
A standard growth accounting framework and correlation analysis (see Section 5.1) was used to analyse the economic implications of ICT adoption for industry growth and labour productivity. A comparison was made between the sector at stake and the whole manufacturing industry. The main findings are:

ICT capital contributes positively to **value added growth** in the GCC sector as well as in the total manufacturing industry, but the contribution is relatively low for both industry aggregates, typically accounting for 0.1-0.5% of annual growth. There are pronounced differences between countries and the periods analysed (see Section 5.2.2).

Total factor productivity (TFP), the residual that cannot be statistically explained (or accounted for) by the other input factors, accounts for a relatively high share of growth in the GCC sector in most of the countries analysed. This finding is quite specific for capital intensive manufacturing industries such as the GCC or the chemical industry, in particular in comparison to service sectors. It indicates the importance of non-tangible "assets" such as organisational innovation (see Section 5.2.2).

Real fixed **ICT capital stock** has surged in the GCC industry since 1991 in nearly all countries analysed. The average annual growth rate (CAGR) from 1991-2005 was 2.6% across the seven EU countries (see Section 5.3.1).

Development of real fixed ICT capital stock, labour productivity and total hours worked in the GCC industry (UK, 1991-2005, Index: 1991 = 100)



ICT capital stock is strongly positively correlated with **labour productivity growth** in the manufacturing industry and even more so in the GCC sector. The correlation with the number of hours worked is negative (at a less significant level). This does not imply a simplistic, direct causality, though (see Section 5.3.2).

In contrast to (accumulated) ICT capital stock, annual **ICT investments** are not correlated with labour productivity growth and hours worked. This could imply a time lag between the point of investment in ICT and the actual return on investment in terms of productivity growth (see Section 5.3.2).

Conclusions for industry and policy

<to be developed in the final report, once all empirical evidence has been analysed>