

# Marketing Innovations in Croatia

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**Božić, Ljiljana**

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# MARKETING INNOVATIONS IN CROATIA

## MARKETINŠKE INOVACIJE U HRVATSKOJ

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### Ljiljana Božić, Ph. D.

Senior research assistant  
The Institute of Economics, Zagreb  
J.F. Kennedy 7, 10000 Zagreb, CROATIA  
Phone: ++385 1 236 2252  
E-mail: [ljbozic@eizg.hr](mailto:ljbozic@eizg.hr)

### Ključne riječi:

*marketinška inovacija, inovacijske aktivnosti, Community Innovation Survey 2008*

### Key words:

*marketing innovation, innovation activity, Community Innovation Survey 2008 (CIS2008)*

### SAŽETAK

Cilj je ovog rada analizirati uvođenje marketinških inovacija u Hrvatskoj. Riječ je o istraživanju koje pruža uvid u inovativnost u terminima marketinških inovacija. Istražuje se prisutnost marketinških inovacija općenito, a zatim i uvođenje četiriju vrsta zasebno (promjene u dizajnu ili pakiranju, novi mediji ili promotivne tehnike, nove metode distribucije ili kanali prodaje i nove metode određivanja cijena). Uključene su promjene u sva četiri elementa marketinškog miksa. U radu se također istražuje do koje je mjere uvođenje marketinških inovacija vezano za uvođenje drugih vrsta inovacija.

### ABSTRACT

The purpose of this paper is to analyze the introduction of marketing innovations by companies in Croatia. This study provides an insight into the innovativeness with regard to the introduction of marketing innovations. It explores the presence of marketing innovations in general and the introduction of four types of marketing innovation (significant changes to the aesthetic design or packaging, new media or techniques for product promotion, new methods for product placement or sales channels and new methods of pricing goods or services). The changes in all four elements of the marketing mix are described. The paper also explores the extent to which the introduction of marketing innovation is related to the companies that introduce other types of innovations.

## 1. INTRODUCTION

In order to adequately support product innovation development, sophisticated marketing methods are required. This notion is expressed in the early work of Levitt (1960), who argued that innovators must be creative about marketing methods in order to fully profit from product innovations.<sup>1</sup> The importance of marketing in the innovation development process is widely acknowledged in the literature, especially in the context of its contribution to the development of product innovations.

Studies show that there is a relationship between product and marketing innovation and that the companies which innovate with products and processes stimulate the development of marketing (and organizational) innovations.<sup>2</sup> Besides, in the same study authors found that resorting to both product and service innovation contributes to the overall business performance.

The importance of product innovation for business success is widely recognized both in marketing literature and practice. New products lead to better business performance and it is in the interest of long-term business growth to innovate. Improving business performance by developing a new product assumes market success of that new product. Market success of the new product is influenced by various factors, as shown in a vast number of empirical studies.<sup>3</sup> Apart from external factors, there are many factors controlled by the company that can contribute to a better market performance of new products.

In order to introduce an innovation with good prospects for success in the market, the company is required to invest in its development. That does not imply only inbound research and development but also other activities that are important for achieving market success. This primarily refers to marketing a new product whose importance is very well recognized in business practice.

Literature on market success factors emphasizes the importance of marketing for achieving new product success. The level of marketing skills adequacy, along with the level of technical skills adequacy, is the factor that is positively related to new product success.<sup>4</sup> Marketing skills are recognized as a determinant of market success<sup>5</sup> and as a source of competitive advantage.<sup>6</sup> When developing and introducing a new product, it is essential to conduct market research, to test the product prior to its introduction while also informing potential customers about the product and its characteristics and encouraging them to buy it. This applies to both incremental and radical innovations.

Marketing is an integral part of the new product development process. It is difficult to assess innovativeness only by investment in R&D and/or marketing, as both are industry specific. New product development in some industries is dominated by R&D while to others market research and other marketing activities<sup>7</sup> may be crucial. Accordingly, investment in marketing and design needs to be higher for the development of such products.

Another issue with investment in R&D and marketing is that it is difficult to conclude if these activities indicate a greater level of innovativeness or represent nothing but budget spending. The results of the Booz Allen Hamilton annual study highlight the importance of how the money is spent rather than how much money is spent.<sup>8</sup>

Companies with a high level of new product development resources benefit most from integrating R&D and marketing activities, i.e. their integration contributes to market success.<sup>9</sup> There is also the finding of meta analysis according to which a higher level of integration is not necessarily a good way to improve new product performance.<sup>10</sup>

Considering the importance of marketing activities for new product development, its introduction to the market as well as market success, one can understand the relationship between prod-

uct and marketing innovation. Introduction of marketing innovation is an integral part of overall innovation activities.

This paper aims to explore the presence of marketing innovation at companies in Croatia. It provides an insight into the introduction of marketing innovations by Croatian companies. First, the presence of marketing innovations in general is analyzed. Furthermore, the development of four types of innovation, including the changes in all four elements of the marketing mix, is explored. In that manner, it is possible to understand marketing innovation development in greater detail.

Even though the literature links marketing activities and innovation to the development of product innovation, in this paper the introduction of marketing innovation by all companies, regardless of other innovation activities, is explored first. It is important to inspect the overall involvement of Croatian companies in the introduction of marketing innovation as it is not strictly conditional on product innovation. Besides, this study does not hypothesize or aim to identify the relationship among innovation types.

The relationship between product and marketing innovation is acknowledged in the second part of the research. The second part is more focused on determining the extent to which marketing innovation can be introduced when there is an effort to develop other types of innovation. Thus, this paper gives an insight into the introduction of marketing innovations on a general level and explores the extent to which their introduction is related to the companies that introduce other types of innovations (product innovations in particular).

The paper is structured as follows: after the introduction in Section 1, data and methodology are presented in Section 2. Section 3 gives research results, and Section 4 brings main conclusions.

## 2. DATA AND METHODOLOGY

Data relevant for the analysis are obtained from a database on innovation activities of Croatian companies in the period between 2006 and 2008 in the framework of the Community Innovation Survey 2008 (CIS2008).

The total sample consists of 3404 companies. The CIS 2008 covers data on product and process innovation developed over a three year period (2006-2008) as well as data on the innovations that are still ongoing or that have abandoned before completion. Apart from technological innovation (i.e. product and process innovation), this survey also includes data on non-technological innovation (i.e. marketing and organizational innovation).

The aim of the paper is to explore the level of involvement in the marketing innovation development reported by companies in Croatia. The CIS is based on the Oslo Manual that provides guidelines for gathering internationally comparable data on innovation. The definition of marketing innovation in the CIS, adopted from the Oslo Manual, refers to marketing innovation as the implantation of a new marketing concept or strategy significantly different from existing marketing methods.<sup>11</sup> Only significant changes in design, packaging, placement, promotion and pricing are eligible to be reported as marketing innovation while seasonal or routine changes in marketing methods are not considered to be marketing innovations.

To be more precise, there are four types of marketing innovations covered in the CIS 2008: significant changes to the aesthetic design or packaging, new media or techniques for product promotion, new methods for product placement or sales channels and new methods of pricing goods or services. In this study the presence of all four types of marketing innovation in Croatian companies is explored. Prior to analyzing these four types separately, the involvement in devel-

opment of marketing innovation in general is explored.

The study subject is analyzed by employing descriptive statistics. The association between categories is tested using a chi-square test while the ANOVA is used for testing the difference in group means.

### 3. RESULTS

The results presented in Table 1 indicate that the majority of companies in Croatia actually do not introduce marketing innovation. To be more precise, 27.03 percent of all companies introduced marketing innovation (regardless of type). So, according to the results, the majority of companies (i.e. 72.97 percent) were not involved in the activities that resulted in marketing innovation.

Furthermore, most of those that report marketing innovation introduced only one of the four types. In particular, 10.43 of all companies in the sample or 38.59 percent of those that actually introduce marketing innovation innovated with

only one of the marketing innovation types. The companies that succeeded to introduce all four types are few, and their number decreases as the number of marketing innovation types in their portfolio increases. Only 3.64 percent report high involvement in the marketing innovation development (i.e. they are engaged in the introduction of all four types of marketing innovations). Their share in the total number of the companies that have developed marketing innovation is 13.48 percent. The presence of marketing innovation is reported in Table 1.

Further analysis reveals new media or techniques for product promotion as the most represented type of marketing innovation (57.83 percent of those that innovate with marketing innovation or 15.63 percent of all companies). This type of innovation is followed by new methods of pricing (54.89 percent of the companies reporting marketing innovation or 13.78 percent of the total sample) and changes to the aesthetic design or packaging (50.98 percent or 13.78 percent of all companies). New methods for product placement or sales channels are the least represented in Croatian companies (found in just 11.63 percent of all companies).

**Table 1:** Marketing innovation in Croatian companies

	Freq.	Percentage of all companies	Percentage of the companies that report marketing innovation
<b>No marketing innovation</b>	<b>2,484</b>	<b>72.97</b>	-
<b>Marketing innovation</b>	<b>920</b>	<b>27.03</b>	-
of which:			
One type of marketing innovation only	355	10.43	38.59
Two types	272	7.99	29.57
Three types	169	4.96	18.37
Four types	124	3.64	13.48
<b>Total</b>	<b>3,404</b>	<b>100</b>	<b>100</b>

**Table 2:** Marketing innovation by type

	Freq.	Percentage in the total	Percentage of the companies that report marketing innovation
Marketing innovation	920	27.03	
Significant changes to the aesthetic design or packaging	469	13.78	50.98
New media or techniques for product promotion	532	15.63	57.83
New methods for product placement or sales channels	396	11.63	45.00
New methods of pricing	505	14.84	54.89

The companies that report marketing innovations have more employees on average. The average number of employees in such companies is 244, compared to 169 employees in those that do not develop marketing innovation ( $F=53.83$   $p=0.0000$ ). The average number of employees increases along with the number of various types of marketing innovations introduced. A slight exception applies to the groups of two and three types of marketing innovations in the same period. The companies that report having two types are larger on average (by the number of employees) than those with three types of innovation. The companies that report the introduction of all four types of innovation on average employ 515 employees.

**Table 3:** Average number of employees in 2008

Number of employees in 2008	Mean	
No marketing innovation	169.0324	$F=53.83$
Marketing innovation	244.2538	$p=0.0000$
Number of employees in 2008		$F=27.40$ $p=0.000$
No marketing innovation	169.0324	$F=27.40$ $p=0.0000$
1 type of marketing innovation only	168.8907	
2 types of marketing innovations	222.3864	
3 types of marketing innovations	190.042	
4 types of marketing innovations	515.3652	

Next, marketing innovation is analyzed by sector in order to explore if there are any differences between the propensity to develop marketing innovation in manufacturing and services. A cross-tabulation of the two variables is used to examine the presence of marketing innovation (in general) and each type in two sectors separately. Table 4 shows only the percentages of the companies that report having marketing innovation by sectors. Data on the companies that introduce no marketing innovation by sector are not reported.

Analysis reveals that 56.02 percent of marketing innovation is introduced in manufacturing companies while 43.98 percent of marketing innovation comes from services. However, the result is not significant. Therefore, we cannot conclude that there is significant association between the propensity to introduce marketing innovation and sector.

A comparison between the two sectors in respect to each of the four types of marketing innovation points to the existence of significant differences between the introduction of marketing innovations in manufacturing and services companies only when it comes to changes to the design or packaging. More companies that develop this type of marketing innovation belong to the manufacturing (59.65 percent) than the services sector. This is easy to explain as changes to the design and packing are more relevant to goods than they are to services due

**Table 4:** Marketing innovation by sector (percentage of companies that report introduction of particular marketing innovation)

	Manufacturing	Services	
Marketing innovation	56.02	43.98	Pearson chi2(1) = 0.7127 Pr = 0.399
Significant changes to the aesthetic design or packaging	59.65	40.35	Pearson chi2(1) = 5.0915 Pr = 0.024
New media or techniques for product promotion	52.57	47.43	Pearson chi2(1) = 1.2013 Pr = 0.273
New methods for product placement or sales channels	54.16	45.84	Pearson chi2(1) = 0.0745 Pr = 0.785
New methods of pricing goods or services	54.12	45.88	Pearson chi2(1) = 0.1029 Pr = 0.748

to intangibility of services. As to the rest of the marketing innovation types, no statistically significant relationship was found so we are not able to reject the null hypothesis.

In further analysis, manufacturing companies should not be analyzed on this topic separately from services companies as the analysis so far does not support the hypothesis on any significant association between the two. Thus, further analysis is directed toward the examination of marketing innovation in innovative companies. As explained in the introductory section, marketing innovations are often related to the development of product innovations. In other words, there is a general notion that innovative companies innovate with a whole range of various types of innovations. The relationship among various types of innovation, in terms of which innovation fosters the development of other types of innovations and why, are neither analyzed nor discussed in this paper. That issue is too complex to be explored properly with data available, and it goes beyond the scope of this research. However, the marketing innovations in innovative companies are explored briefly in order to see if innovative companies in Croatia are indeed more prone to introduce this type of innovation.

The CIS questionnaire is design is such a manner that all companies can report marketing in-

novation regardless of other innovation. In other words, reporting marketing innovation was not conditional on reporting the development of technological innovations. This fact enables us to identify the percentage of marketing innovation that comes from the companies involved in the development of technological innovations. Results are presented in Table 5.

These results generally indicate that the introduction of marketing innovation is related to overall innovation activities. The great majority of companies (77.07 percent) that have developed marketing innovation also innovated with either product and/or process innovation (i.e. technological innovation). In only 22.93 percent of cases was marketing innovation introduced by the companies that report having no successfully developed technological innovation. Pearson chi2 indicates that the association is indeed significant.

To get a more precise insight into the relationship between different types of innovation, the introduction of marketing innovation by the companies that report successful development of product innovation is explored. As mentioned before, marketing innovations contribute to a full exploitation of product innovation. Therefore, it is worth analyzing if marketing innovation development in Croatian companies is somehow

**Table 5:** Innovation activities in companies that report marketing innovation

	Marketing innovation	No marketing innovation	
Technological innovation	77.07	22.18	Pearson chi2(1) = 867.3878 Pr = 0.000
No technological innovation	22.93	77.82	
Product innovation	59.57	12.12	Pearson chi2(1) = 807.3467 Pr = 0.000
No product innovation	40.43	87.88	
Internal R&D	55.03	38.16	Pearson chi2(1) = 37.0388 Pr = 0.000
No investment in internal R&D	44.97	61.84	
Engagement in market introduction of innovation	60.97	24.70	Pearson chi2(1) = 172.5348 Pr = 0.000
No engagement in market introduction of innovation	39.03	75.30	

encouraged by the development of product innovations. As is the case with the technological innovation development, most marketing innovations are developed in the presence of product innovations. Almost 60 percent of marketing innovations is developed in the companies that introduced product innovations.

Another indicator of companies' efforts to innovate is the level of their investment in R&D. Internal R&D is considered to be the investment in knowledge creation<sup>12</sup>. When inspecting marketing innovations in innovative companies, it is important to explore their engagement in R&D. According to the results, 55.03 percent of the companies that report having marketing innovation are involved in internal R&D activity. Furthermore, the average total R&D is higher in the companies that innovate with marketing innovation while the average internal R&D is lower. However, the difference is not statistically significant (Table 6).

There is no significant difference in the average investment in internal R&D even when compared to a simultaneous development of various types of marketing innovation (Table 7). The companies that report introducing all four types of marketing innovation invest in internal R&D

most but those that introduced no marketing innovation invest in internal R&D more than those that indeed introduced three types of innovation. Internal R&D is an indicator of involvement in the technological rather than marketing innovation and its level is determined by numerous factors. The aim was not to imply any relationship between internal R&D and marketing innovation. It was rather to assess if the companies that report marketing innovations are actually highly involved in innovation activities.

**Table 6:** Mean total investment in R&D and mean expenditures on internal R&D in respect to development of marketing innovation

	Mean	ANOVA
<b>Total investment in R&amp;D</b>		
No marketing innovation	2,824,244	F=0.77 p=0.3806
Marketing innovation	3,727,381	
<b>Expenditures on internal R&amp;D</b>		
No marketing innovation	877,003.4	F=0.07 p=0.797
Marketing innovation	738,813.8	

When we look into total R&D, the companies with all four types of marketing innovation de-



veloped were found to have invested in R&D most. Results reveal that the companies with two types of marketing innovation introduced over a three-year period invested the smallest amount in R&D. In this case, the differences in means among the groups are statistically significant.

**Table 7:** Mean total investment in R&D and mean expenditures on internal R&D in respect to intensity of involvement in introduction of marketing innovation

	Mean	ANOVA
<b>Total investment in R&amp;D</b>		
No marketing innovation	2,824,244	F=2.72 p= 0.0283
1 type of marketing innovation only	2,798,518	
2 types of marketing innovation	714,973	
3 types of marketing innovation	2,844,993	
4 types of marketing innovation	8,756,426	
<b>Expenditures on internal R&amp;D</b>		
No marketing innovation	877,003.4	F=0.46 p=0.7621
1 type of marketing innovation only	1,021,097	
2 types of marketing innovation	350,013.6	
3 types of marketing innovation	204,419.6	
4 types of marketing innovation	1,540,817	

The last characteristic of innovation effort in the companies that report marketing innovation is their engagement in the market introduction of innovation. As previous results show that marketing innovations are introduced mostly by the companies that are highly involved in the development of other types of innovations, it is expected that they are concerned about the market introduction of innovation. The results indeed confirm this, as 60 percent of the compa-

nies that innovate with marketing innovations report engagement in the market introduction of innovations.

## 4. CONCLUSION

This paper gives an overview of the marketing innovation introduction by Croatian companies. It explores the state of this type of non-technological innovation on a case of the country that lags behind EU-27<sup>13</sup> when it comes to innovativeness.<sup>14</sup> As regards marketing innovation, results reveal that almost one third of companies introduce this type of innovation. In most cases they introduced only one of the four types of marketing innovation over the three-year period under review.

This result is not surprising if interpreted taking into account a general notion on the relationship between marketing innovation and the development of product innovations. Croatian companies are not generally innovative in terms of technological innovations, and marketing innovation is no exception to the general situation in Croatia. The majority of marketing innovation is introduced by the companies that are innovators. Another confirmation of the relationship between the two types of innovation is the finding that marketing innovations are for the most part introduced by the companies that are also involved in other innovation activities.

It should also be pointed out that the most important type of marketing innovation present in Croatia is the one that concerns promotion. Most companies report the introduction of new media or techniques for product promotion, indicating that such companies are aware of the importance of promotion activities. Consequently, they introduce new media and techniques for promotion. This is just one possible explanation but this research provides no evidence on what it is that determines the introduction of marketing innovations.

Further analysis can be directed toward exploring the drivers of marketing innovations. Also, future research can aim at a detailed exploration of companies' characteristics regarding the structure of their marketing innovation portfolio.

It might also be worth exploring if there are any differences among the companies that introduce various types of marketing innovations and/or structure their portfolio of marketing innovation in a different manner.

## LITERATURE

1. Cooper, R.G., Edgett, S.J., Kleinschmidt, E.J.: New product portfolio management: Practices and performance, **Journal of Product Innovation Management**, Vol. 16, 1999, pp. 333-351.
2. Cooper, R.G.: The dimension of industrial new product success and failure, **Journal of Marketing**, Vol. 43, 1979, pp. 93-103.
3. Cooper, R.G., Kleinschmidt, E.J.: Benchmarking the Firm's Critical Factors in New Product Development, **Journal of Product Innovation Management**, Vol. 12, 1995, pp. 374-391.
4. Czarnitzki, D., Hottenrott, H.: R&D investment and financing constraints of small and medium-sized firms, **Small Business Economics**, Vol. 36, 2011, pp. 65-83.
5. Day, G.S., Wensley, R.: Assessing Advantage: A Framework for Diagnosing Competitive Superiority, **Journal of Marketing**, Vol. 52, 1988, pp. 1-20.
6. de Brentani, U.: Innovative versus incremental new business services: Different keys for achieving success, **Journal of Product Innovation Management**, Vol. 18, 2001, pp. 169-187.
7. EUROSTAT Statistical Books: **Science, technology and innovation in Europe**, 2010.
8. Henard, D.H., Szymanski, D.M.: Why Some New Products Are More Successful Than Others, **Journal of Marketing Research**, Vol. 38, 2001, pp. 362-375.
9. Kleinschmidt, E.J., Cooper, R.G.: The Impact of Product Innovativeness on Performance, **Journal of Product Innovation Management**, Vol. 8, 1991, pp. 240-251.
10. Leenders, M.A.A.M., Wieranga, B.: The effect of the marketing-R&D interface on new product performance: The critical role of resources and scope, **International Journal of Research in Marketing**, Vol. 25, 2008, pp. 56-68.
11. Levitt, T.: Growth and Profits Through Planned Marketing Innovation, **Journal of Marketing**, Vol. 24, No. 4, 1960, pp. 1-8.
12. OECD: Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data, 3<sup>rd</sup> Edition
13. Sarkar, S.: **Innovation, market archetypes and outcome – An integrated framework**, Physica-Verlag: A Springer Company, 2007.
14. Schmidt, T., Rammer, C.: Non-technological and Technological Innovation: Strange Bedfellows?, **ZEW Discussion Paper No. 07-052**, 2007.
15. Trott, P.: **Innovation Management and New Product Development**, Prentice Hall, Harlow, 2005.
16. Wren, B.M., Souder, W.E., Berkowitz, D.: Market orientation and new product development in global industrial firms, **Industrial Marketing Management**, Vol. 29, 2000, pp. 601-611.

## References

- <sup>1</sup> Levitt, T.: Growth and Profits Through Planned Marketing Innovation, **Journal of Marketing**, Vol. 24, No. 4, 1960, pp. 1-8.

- <sup>2</sup> Schmidt, T., Rammer, C.: Non-technological and Technological Innovation: Strange Bedfellows?, **ZEW Discussion Paper No. 07-052**, 2007, pp. 32.
- <sup>3</sup> e.g. Cooper, R.G., Edgett, S., Kleinschmidt, E.J.: New product portfolio management: Practices and performance, **Journal of Product Innovation Management**, Vol. 16, 1999, pp. 333-351.; Cooper, R.G.: The dimension of industrial new product success and failure, **Journal of Marketing**, Vol. 43, 1979, pp. 93-103.; Cooper, R.G., Kleinschmidt, E.J.: Benchmarking the Firm's Critical Factors in New Product Development, **Journal of Product Innovation Management**, Vol. 12, 1995, pp. 374-391.; de Brentani, U.: Innovative versus incremental new business services: Different keys for achieving success, **Journal of Product Innovation Management**, Vol. 18, 2001, pp. 169-187.; Kleinschmidt, E.J., Cooper, R.G.: The Impact of Product Innovativeness on Performance, **Journal of Product Innovation Management**, Vol. 8, 1991, pp. 240-251.
- <sup>4</sup> Wren, B.M., Souder, W.E., Berkowitz, D.: Market orientation and new product development in global industrial firms, **Industrial Marketing Management**, Vol. 29, 2000, pp. 609.
- <sup>5</sup> Cooper, R.G.: The dimension of industrial new product success and failure, **Journal of Marketing**, Vol. 43, 1979, pp. 95.
- <sup>6</sup> Day, G.S., Wensley, R.: Assessing Advantage: A Framework for Diagnosing Competitive Superiority, **Journal of Marketing**, Vol. 52, 1988, pp. 1-20.
- <sup>7</sup> Trott, P.: **Innovation Management and New Product Development**, Prentice Hall, Harlow, 2005, pp. 397.
- <sup>8</sup> Sarkar, S.: **Innovation, market archetypes and outcome – An integrated framework**, Physica-Verlag: A Springer Company, 2007, pp. 9.
- <sup>9</sup> Leenders, M.A.A.M., Wieranga, B.: The effect of the marketing-R&D interface on new product performance: The critical role of resources and scope, **International Journal of Research in Marketing**, Vol. 25, 2008, pp. 64.
- <sup>10</sup> Henard, D.H., Szymanski, D.M.: Why Some New Products Are More Successful Than Others, **Journal of Marketing Research**, Vol. 38, 2001, pp. 372.
- <sup>11</sup> OECD: **Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data**, 3<sup>rd</sup> Edition, 2005.
- <sup>12</sup> Czarnitzki, D., Hottenrott, H.: R&D investment and financing constraints of small and medium-sized firms, **Small Business Economics**, Vol. 36, 2011, pp. 65-83.
- <sup>13</sup> EU-27: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.
- <sup>14</sup> EUROSTAT Statistical Books: **Science, technology and innovation in Europe**, 2010.