

**High Technology:**

**St. Gall Rhine Valley**

**The Comparison**



## **About us:**

CONTOR GmbH was entered in the Commercial Register in 1970.

The company was active as an estate agent, building authority and real estate developing company, also in large construction projects.

Already at that time, one of the main fields of activity of one of the managing partners, Martin Lüttich, was the consulting of municipalities in the setting up of industrial and commercial areas, as well as the consulting of industrial and business establishments in the location search.

When today's managing partner, Dipl. Kfm. Henner Lüttich, joined the company in 1983, the consulting and redevelopment of business enterprises in difficulty became another main field of activity.

Several times during redevelopment work, it turned out that the decision of investment in the wrong location had led to an operational emergency situation.

In 1996, Henner Lüttich started to systematically formulate a method for the location search of enterprises.

It is a method of location search using multivariate statistical methods that was presented in several universities with most positive results.

## **Expert opinions:**

- Julius Lazarek, GFK Marktforschung, Nuremberg  
"CONTOR's process of location search for an enterprise with multivariate methods is a good combination of individual enterprise consulting, target-oriented use of multivariate statistical methods and complexly researched regional data as the basis for the calculation."
- Prof. Dr. Johann Bacher, University of Erlangen – Nuremberg  
..."The choice of location of an electronics enterprise with the help of multivariate statistical methods and the choice of location of a mechanical engineering enterprise with the help of multivariate statistical methods..... The cluster analysis was used in a technically correct way in both cases."
- Prof. Dr. Karl-Werner Schulte, European Business School, Oestrich – Winkel:  
"The location search process with multivariate statistical methods developed by Henner Lüttich is a basic improvement in the area of location search, which is one of the most difficult and important decisions of an enterprise. For the first time, an objective, area-wide analysis with the consideration of all location variables that are important to a business enterprise is possible."

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# 1 Introduction

This study provides a location analysis for the St. Gall Rhine Valley. It is the aim of this analysis to compare the St. Gall Rhine Valley to the regions of the European Union. Within the framework of the analysis, the St. Gall Rhine Valley is compared to 1207 regions of the European Union. The countries Malta and Cyprus are excluded from the analysis. The results presented in the following show the St. Gall Rhine Valley in comparison to the 10 best regions of the European Union and the three best regions of Germany and Austria.

This analysis refers to the study “Hochtechnologie: Ein Vergleich Deutschland – Österreich” (High Technology: A comparison Germany-Austria) which was conducted by CONTOR GmbH in March 2005 and published in the March edition of the “Manager Magazin”. Particularly the choice and the weighting of the variables in accordance with their relevance to high-tech enterprises were adopted for this analysis. High-tech enterprises are business enterprises whose production involves high technology, e.g. component suppliers for the automobile industry. We are aware that the typical high-tech enterprise on which this analysis is based does not exist. Each enterprise has its own location requirements. We tried to record particularly important requirements for a location and assign them weighting factors that seemed to be realistic for high-tech enterprises. A universal validity is assumed which is obviously not given. Different non-representative studies we made have shown that the analyses do not react very strongly to small changes in variables and weighting factors. This means that a region which scores well in this analysis will most likely also score well if the variables or weighting factors vary slightly.

Special features of this analysis:

In this analysis, the St. Gall Rhine Valley is compared to the Nuts 3 Regions of the European Union. These regions differ in size and are generally larger than the St. Gall Rhine Valley. In Germany, for example, the Nuts 3 Regions are the administrative districts and the urban municipalities. In Switzerland, the Nuts 3 Region to which the St. Gall Rhine Valley belongs is the region of St. Gall. CONTOR GmbH draws up analyses on the basis of the regions of the European Union. Because Switzerland is not a member of the European Union, we do not have any data about Switzerland. The data for the St. Gall Rhine Valley was provided to us by the Chamber of Industry and Commerce of St. Gall – Appenzell. Possible differences in definitions are mentioned in the section “Definitions”.

## 1.1 Significance of the Choice of Location

Choosing a location is one of the most important decisions a business enterprise has to make when it is founded or relocated. It is a decision of long-term impact that can only be revised with difficulty. It has a direct influence on investment costs (real estate and construction prices) when setting up a company. In the long term, it influences costs like public charges, wages and transportation costs. It has a long-term influence on the revenue picture through marketing variables like spending power, population structure and competition. A badly chosen location can destroy a company.

Nevertheless, the choice of location as an economic decision of a business enterprise is, surprisingly, still a neglected subject nowadays. In the general economic literature, for example, the choice of location as an economic problem is usually addressed on a single page or even less. This is surprising for different reasons:

- The difficulty of the choice of location is not a new problem. The first scientific study on this subject was drawn up as early as 1826. Since then, various papers have been written about this subject. Studies have shown that the average length of stay at a location is 20 years. Once a decision regarding a location has been made, it can usually not be revised. The decision binds so much capital that, when it becomes obvious that the location is objectively wrong, there is no capital left for relocation. In such cases, the wrong decision leads directly to insolvency. The choice of location of an enterprise is of strategic importance in the long-term and therefore has to be made very carefully.
- The choice of location of a business enterprise has a direct influence on the costs and the income of the enterprise. Investment costs of the business enterprise include, for example, the building land prices and regionally differing building costs as well as regionally differing costs for setting up the business enterprise. In business operations, the following costs depend on the location: wages, salaries, taxes or municipal charges, as well as earnings, which may depend on the regional spending power, on the population of a region or on the proximity to a fleet customer. No other decision made by a business enterprise can influence costs and income in such a way.
- The choice of location is one of the most important decisions a business enterprise has to make. Once the enterprise knows which products it wants to produce or sell, which markets it wants to supply with these products and what the basic production requirements are, the question of the suitable location arises.

Business enterprises hire a plethora of consultants to search for savings possibilities in all of their divisions, to find synergy effects and to discover new markets. However, the choice of location is still often made by instinct – despite the strategic long-term nature of the decision, despite its enormous influence on the costs and the income of the business enterprise and despite the fact that it should have a high priority among all the decisions an enterprise makes. This does not do justice to the relevance of this decision.

## **1.2 Looking for a Location with Conventional Methods**

There is a multiplicity of model types and approaches that are used to look for a location, such as geometric models, static and dynamic capital budgeting or mathematical methods used in Operations Research.

In practice, local conditions and local requirements are often compared as follows:

- Drawing up a system of local requirements
- Preparing a ranking of local factors regarding their significance to the settling, with potential weighting or assessment by points of the factors or their determinants
- Determining an area for the search for location, or determining the local alternatives to be examined
- Assessing the potential local alternatives with regard to local factors
- Comparing local requirements to the local conditions of selected potential locations by using an assessment by points, a benefit analysis or a profile method.

The selection of the potential locations is usually based on the experience of the decision-makers or their consultants or on selective analyses. Not all the potential locations have to be considered.

Nowadays, benefit analyses and profile methods are usually used to systematically look for a location. Apart from the disadvantage that not all potential locations can be examined, already at the beginning of the analysis, subjective influences of the user are visible in the way that benefit values are rated. This leads to results for which it is no longer possible to distinguish which part relies on data and facts and which part relies on subjective assessments that may be wrong. When looking for a location, there has to be room for subjective assessments which may, for example, rely on an enterprise's philosophy. However, at this stage of the analysis, it must be clear where, in the decision, the objectivity based on data ends, and where the subjectivity based on the enterprise's philosophy begins. Subjective influences have to be taken into account when the decision-maker makes the decision, and not when the employees or consultants prepare the decision.

An objective mathematical comparison of local conditions and local requirements is therefore not given.

### **1.3 Our Requirements for a Selection Process**

The search for a location for a business enterprise is actually nothing else than the simple comparison of the requirements specific to the enterprise with the specific conditions given at each location. It is important that the requirements are specific to the enterprise, i.e. the mechanical engineering enterprise A in city X has different location requirements than the mechanical engineering enterprise B in city X. This is due to the fact that the two enterprises – despite being in the same branch of business – produce different products, supply different clients and have different philosophies.

In the search for a location and in the selection of the methods used, it is of the utmost relevance to adjust the search to the aims of the business enterprise. This is, once again, due to the fact that each business enterprise has different requirements for a suitable location. The requirements specific to the business enterprise depend on the enterprise's system of objectives. In the search for a location, all sub-domains of the business enterprise have to be considered specifically for that enterprise, and

the following questions have to be asked: “What products does this business enterprise produce or sell?” “What are these goods produced with?” “To whom will these goods be sold?” The individual acquisition, production and distribution needs of the business enterprise also have to be considered individually.

Theses:

- With growing competition on the European level, the question of location and therefore the search for the right location is of vital importance for the business enterprise.
- There are no bad locations, but there are locations that are not suitable for each business enterprise.
- Each location has its specific conditions which are characterised by climatic, geographic, socio-economic or political conditions.
- Each business enterprise has its specific requirements for a location which depend, among other things, on the product, input and output market or the investment motive.

As mentioned before, the search for location of a business enterprise is nothing else than the best possible comparison of the business enterprise’s requirements with the local conditions. This process, which is actually quite simple, is complicated by the great number of potential locations, the multiplicity and large spectrum of local conditions and the multiplicity of specific characteristic location requirements.

Up to now, when comparing potential locations with each other, it has been customary to compare each location to all the other potential locations. In this so-called comparison by pairs, the number of comparisons to be made is calculated by the formula  $n(n-1)/2$ . Thus, if 10 locations are to be examined, 45 comparisons by pairs are necessary, and if 100 locations have to be compared to each other, as many as 4950 comparisons by pairs have to be made. Studies have proven that human beings do not have the ability to examine considerably more than 10 alternatives in this way. Thus, if out of 1500 potential locations in Europe only about 15 locations are tested for their suitability, the statistic probability of finding a suitable location is only 1%. The search for a location is therefore a lottery, and the effort usually required for the search is in no economically reasonable proportion to the possibility of success. With the usual methods, it is impossible to examine the roughly 1500 regions of Europe. Such a comparison can only be made by means of mathematical methods.

In order to be able to fulfil the specific location requirements of a business enterprise, the requirements have to be specified as clearly as possible. If facts, i.e. data, instead of subjective assessments are still to be included in the search for location in future, a multiplicity of local factors and variables is necessary for which market research data have to be compiled.

The described requirements for a search process for a location lead to the following conclusions:

An analysis is necessary that...

- examines all the potential locations simultaneously
- uses facts and market research data
- takes into account the specific requirements of a business enterprise through a multiplicity of potential location factors or local variables.

## 1.4 Location Search vs. Location Analysis

The comments made so far about the search for a location are also valid for the location analysis. For the location analysis, too, it is essential to analyse all the regions in an area to ensure a real comparison with all regions, the better and the worse ones. It is also important for the location analysis to conduct an analysis based on facts in order to minimise subjective influencing factors. Certainly, within a location analysis, local requirements specific to a business enterprise cannot be taken into account. However, tendencies of strengths and weaknesses of one region in comparison to another region can be clearly elaborated. This is what this analysis does for the high-technology branch in the St. Gall Rhine Valley.

The location search and the location analysis both look at the problem of the “market of locations” from different angles. For a business enterprise, the search for an ideal location has priority, where only the ideal location alternatives within a specific area determined by the business enterprise are relevant. For the location analysis, on the other hand, the comparison of one region with all the other regions of the area of analysis has priority in order to determine the strengths and weaknesses of that region in comparison to better or worse regions. One could describe the search for a location as a demand-oriented point of view and the location analysis as a supply-oriented point of view.

## 1.5 Our Methods of Analysis

Contor GmbH offers two different forms of analysis whose application depends on the aims of the analysis.

- Analysis of the regions with the help of multivariate statistical methods developed by Contor GmbH. This method is suitable in particular to take into account individual local requirements specific to the business enterprise and to work out in detail the differences of the regions as far as those requirements are concerned.  
This method is ideal to solve the problem of the “choice of location” of a specific business enterprise in great detail. The method involves great consultation, work and interpretation effort.
- Analysis of the region with software that we have developed. This software ranks the regions with regard to local requirements that have to be selected. This method is very helpful to quickly and concisely rank the regions with regard to the selected local requirements. It is particularly suitable for the location analysis.

Both methods of analysis use the same market research data. Both methods simultaneously examine all the regions area-wide. Both methods can lead to more or less the same results. As mentioned before, the choice of method depends on the purpose of the analysis.

The purpose of the following analysis is to compare the St. Gall Rhine Valley to the 10 best regions of the European Union and the three best regions of Germany and Austria. Because this is a classic problem of a location analysis, the following analysis is made with the analysis software that we have developed.

## 1.6 The Method

First of all, the relevant location factors, determinants and variables for the high-technology branch are compiled. Normally, the location factors are restricted by several determinants, and the determinants include a multiplicity of variables whose characteristics influence the analysis in the end. The following location factors are basically available:

- Workforce
- Wages and salaries
- Labour productivity
- Management advantages
- Resourcing
- Sales volume
- Origin goodwill
- Immissions/Emissions
- Traffic
- Taxes
- Energy
- Telecommunications
- Population
- Health care system
- Education and knowledge
- Economy
- Wealth
- Growth opportunities
- Security
- Promotion of economic development
- Tourism
- Social peace

This system of location factors, determinants and variables shall be presented in the following table by means of an example of the location factor “workforce” in a Germany-wide search for a location.

Location factor	Determinants	Variables
Workforce	1. workforce by gender	1.1 number of male workers 1.2 number of female workers
	2. workforce by nationality	2.1 number of German workers 2.2 number of foreign workers
	3. workforce by education	3.1 number of workers without professional training 3.2 with professional training 3.3 with industrial training 3.4 with vocational school 3.5 with technical school 3.6 with technical college 3.7 with university
	4. workforce by employment relationship	4.1 workers 4.1.1 non-skilled worker 4.1.2 skilled worker 4.2 employees 4.2.1 with simple tasks 4.2.2 with difficult tasks
	5. workforce by age	5.1 number of workers in 11 different age groups
	6. workforce by professional group	6.1. number of unemployed workers in about 100 professional groups (e.g. unemployed toolmakers)
	7. employees by economic field	7.1. number of workers in about 300 economic fields (e.g. employees in boiler industry)

These location factors include about 50 determinants and more than 1000 variables in a Germany-wide search for location, as well as several hundred variables in a search for location in all of Europe.

The location variables relevant for the area of high-technology were filtered from the described system of location factors, location determinants and location variables.

The characteristics of these relevant location variables of all the regions of the European Union and the St. Gall Rhine Valley, excluding the regions of Malta and Cyprus, are taken into account in this analysis.

## 2 The High-Tech Enterprise

### 2.1 Requirements

It is our objective to analyse the regions of the European Union countries according to the location requirements of a high-tech enterprise. It has to be mentioned that this typical high-tech enterprise does not really exist. As already described in detail, the local requirements are specific for each business enterprise and do not just depend on the branches. This analysis can lead to conclusions that illustrate tendencies in the preferences of high-tech enterprises when finding a location. It is assumed that high-tech enterprises tend to make the following location requirements:

- Overall labour costs
  - Employee payment in the manufacturing sector
  - Productivity in the manufacturing sector
  - Working hours in the manufacturing sector
- Proximity to research and development
  - Proximity to universities with electro-technology/automation departments
- Taxes
  - Corporate taxes
- Traffic
  - Motorway
  - Airport
- Workforce
  - Employees in the manufacturing sector
- Regional attractiveness
  - Crime rate
  - Corruption
- Prospects for the future
  - Growth opportunities
  - Birth rate

### 2.2 Weighting

The location factors and the location variables are weighted according to their importance for the business enterprise. First, the weighting factors for the location factors are determined. These weighting figures show the relevance of the corresponding factors. Then, the weighting factors for the location variables are determined. These weighting figures show the relevance of each variable within a location factor. The following weighting factors have been determined for the location factors and the location variables:

- Overall labour costs: weighting 25%
  - Employee payment in industry: weighting 0.4
  - Productivity in industry: weighting 0.4
  - Working hours in industry: weighting 0.2
- Proximity to research and development: weighting 17.5%
  - Proximity to universities with electro-technology/automation departments
- Taxes: weighting 17.5%
  - Corporate taxes
- Traffic: weighting 13%
  - Motorway: weighting 0.5
  - Airport: weighting 0.5
- Workforce: weighting 9%
  - Employees in industry
- Regional attractiveness: weighting 9%
  - Crime rate: weighting 0.5
  - Corruption: weighting 0.5
- Prospects for the future: weighting 9%
  - Growth opportunities: weighting 0.5
  - Birth rate: weighting 0.5

Based on the characteristics of the above-mentioned location factors and location variables of all the regions of the European Union and the St. Gall Rhine Valley, and based on the weighting assigned to them, our software calculates the ranking of the regions.

## 2.3 Definitions

### 2.3.1 Overall Labour Costs

The most important location factor is a factor which could be described as overall labour costs. This factor is constituted of the variables “employee payment”, “productivity” and “working hours”.

On its own, the examination of the variable “employee payment” would most probably not lead to any conclusions in line with the aims of the analysis, i.e. the comparison of the St. Gall Rhine Valley to the other regions of the European Union countries. For a business enterprise, it is important to know not only the labour costs per time period, but also the output in that time period. This is at least true for the majority of business enterprises. Only a few business enterprises are able to determine the productivity largely by themselves, independent of the qualification and the motivation of the employees. This could be the case for business enterprises that educate their employees on the newest machines from the very beginning and do not take into consideration their education. After a short assessment of the single variables “employee payment” and “productivity”, a combined assessment of these variables is made by relating them.

The information of the variable “working hours” is already integrated in the variables “employee payment” and “productivity”. One criterion for the incorporation of the variable “working hours” is the fact that in a new business enterprise with modern machinery and employees that are trained on this machinery, a much higher annual productivity can be achieved with the same hours of work. It is further incorporated

into the analysis since it could be considered a synonym for the flexibility of the labour market. The incorporation of the variable “working hours” does not falsify the results since it is only part of the factor “overall labour costs”, and since the weighting is only done within this factor.

#### **2.3.1.1 Employee Payment**

The employee payment corresponds to the gross monthly income plus the employer’s social insurance contributions. The employee payment has been determined for the manufacturing sector.

#### **2.3.1.2 Productivity**

The productivity is expressed by the gross value added in the manufacturing sector weighted with the purchasing-power parity of the countries. It is expressed by the purchasing-power standard per year and employee in the manufacturing sector. The purchasing-power standards are an artificial currency which converts the different currencies to a common currency and takes into account the purchasing-power differences in the countries.

#### **2.3.2 Proximity to Research and Development**

The distance to the next region that has a university with an electro-technology or automation department is stated.

#### **2.3.3 Corporate Taxes**

Corporate taxes are the taxes on profits of the business enterprises. In Germany, for example, they include the corporate income tax and the trade tax. Taxes on dividends, distributions of dividends and comparable taxes are not incorporated in the analysis.

The data are based on the data of countries. Differences on a regional level, for example due to different trade taxes in Germany, are not taken into account. In countries which, for example, levy regional taxes like the trade tax, average values are used for those taxes.

Nominal tax rates for the European Union countries are used. Differences e.g. in the basis of proration, the tax systems etc. are not taken into account. No conclusions can be made about the actual tax burden of the business enterprise. However, this variable is a good indication of the corporate tax burden in the countries.

In these variables, there is a possible difference in the definition from the data of the St. Gall Rhine Valley. The data given by the Chamber of Industry and Commerce St. Gall-Appenzell show the actual average tax burden of the business enterprises. The source of the data is the ZEW, Zentrum für Europäische Wirtschaftsforschung (Centre for Economic Research in Europe), the IBC Taxation Index. In the discussion with the Chamber of Industry and Commerce St.Gall-Appenzell, it was obvious that the tax rates in Switzerland depend on the reported earnings in relation to the used equity capital. The recognition of nominal tax rates would therefore not be possible. The sources of Contor GmbH assume corporate taxes between 16.4% and 29.2% in Switzerland. The data of 20.3% for the St. Gall Rhine Valley provided to Contor GmbH are within this framework. This fact, plus the statement of the Chamber of Industry and Commerce St.Gall-Appenzell that the corporate taxes in the St. Gall

Rhine Valley are roughly the same as the average corporate taxes in all Swiss cantons, illustrates the plausibility and comparability of the Contor data with the data provided in this analysis. A possible difference between the tax rate of 20.3% for the St. Gall Rhine Valley used in the analysis and a possible tax rate comparable to our data would lead to different results in the analysis. The mentioned differences, however, would be small due to the above-mentioned reasons, and small differences would change nothing in the main tendency of the analysis. Of course, the ranking could be changed slightly. In an analysis in which a tax rate of 25% was used for the St. Gall Rhine Valley, for example, the region only lost one rank.

#### **2.3.4 Traffic**

It is assumed that proximity to motorways and airports is important for high-tech enterprises.

##### **2.3.4.1 Motorway**

The distance in kilometres to the geographical centre of the closest region with a direct motorway connection has been determined.

##### **2.3.4.2 Airport**

The distance in kilometres to the geographical centre of the closest region with an international airport has been determined. International airports are airports in which entries and departures with all the necessary formalities (customs, immigration) are possible on a regular basis. For the St. Gall Rhine Valley, the airport "Altenrhein" fulfils these criteria.

#### **2.3.5 Workforce**

It is assumed that the complete potential workforce that is basically available to the business enterprise is constituted by the currently unemployed workers and the employed persons. The potential of the currently employed persons can be realised through contracting away or natural workplace fluctuation, or it is the result of factory closure. We were able to determine the data of the employed persons in different branches of economic activity. Only general data of unemployed workers in the individual regions are available, i.e. the data do not reveal the branch affiliation or education of the unemployed workers. It is assumed that among the total of unemployed workers, a large part is not qualified to work for a business enterprise that is looking for workers. The majority of unemployed persons in a region does not seem to be suited for a high-tech enterprise that relies on qualified employees.

Furthermore, it has to be assumed that in branches with a high number of employees, there is also quite a high number of junior staff in training.

The absolute number of unemployed or employed workers does not necessarily reflect the available potential workforce in a region. The absolute workforce in a populous region is most likely larger than the workforce in a region with a small population. However, the competition will consequently also be stronger, and therefore it is more difficult for a business enterprise to find suitable employees.

A better indicator for the potential workforce would therefore be the part of unemployed or employed workers in the entire population. In regions where this part is larger, most likely the potential workforce of suitable employees is also larger.

Furthermore, the attractiveness of a business enterprise to potential employees in regions with high unemployment (as measured by the part of unemployed persons) could also increase.

Since the variable “part of workforce in the entire population” cannot be meaningful in regions with many elderly people or many children, the part of employed persons is measured by the economically active population.

In this analysis, the data of the parts of employed persons in the manufacturing sector in the entire economically active population is used. It is assumed that, among the total of economically active persons in the manufacturing sector, a sufficient number of trained and qualified employees can be found.

### **2.3.6 Regional Attractiveness**

The location factor “regional attractiveness” is important when a business enterprise settles down somewhere. This factor is linked to the determinant “security” and is composed of the variables “crime rate” and “corruption”.

#### **2.3.6.1 Crime Rate**

The data set is composed of surveys about crime rates which were conducted by UNICRI and edited by us. The data show the percentage of interviewees in the countries who fell victim to a criminal act within the period the interviews were held or in the previous year. Interviews conducted within several periods are included. For the acceding countries, the crime rates in the capitals are available, whereas for the old European Union countries, state-wide data are available. A comparison of the state-wide data with the data available for the large cities resulted in differences of up to 30%. For this reason, the data of countries in which only data for large cities were available were reduced by 20%.

#### **2.3.6.2 Corruption**

The data were taken from the “Corruption Perceptions Index 2004” published by Transparency International.

The data are based on interviews about corruption in the countries conducted with country analysts and businessmen. Values on a scale from 0 to 10 were given, where 0 meant “highly corrupt” and 10 meant “not corrupt”.

### **2.3.7 Prospects for the Future**

The location factor “prospects for the future” is composed of the two variables “growth opportunities” and “birth rate”. This classification is based on the idea that in a country, the macroeconomic and microeconomic premises for competition and growth should be given. This is measured by the variable “growth opportunities”. In an aging population, a population with a low birth rate, the strength for necessary innovations could be missing. These connections cannot be proven by us; however, they became apparent in several discussions with business enterprises.

### **2.3.7.1 Growth Indicator**

The data are based on studies conducted by the World Economic Forum.

The World Economic Forum has published two reports, the Growth Competitiveness Index and the Microeconomic Competitiveness Index.

Both reports have an index with the ranking of 104 examined countries with regard to their competitiveness. Each index examines the competitiveness from a slightly different point of view.

The Growth Competitiveness Index (GCI) tries to evaluate the basic growth opportunities of a country. It examines the sources of the gross domestic product per person.

The GCI is based on three basic variables which lead to economic growth in the medium term or in the long term:

- Technology (e.g. patents)
- Collective goods (e.g. corruption, laws, contracts)
- Macroeconomic environment (e.g. inflation, exchange rates)

The Microeconomic Competitiveness Index (MICI) examines the underlying requirements for sustained high productivity in 103 countries, measured by the gross domestic product per person.

Productivity and increasing wealth are based on corporate culture and applied business practices and on the quality of the microeconomic business environment in which the business enterprises compete with each other.

Two variables:

- Corporate culture
- National business environment

We combined these two indices to form a new index.

### **2.3.7.2 Birth Rate**

The data illustrate the gross birth rate, i.e. the number of live births per 1000 inhabitants.

## **2.4 Area for Location Search**

All the regions of the European Union and the countries acceding to the European Union in 2004 are analysed. The countries Malta and Cyprus are excluded from the search.

In these European Union Countries, approximately 480 million people live in an area of 4.25 million square kilometres.



## 2.5 Minimum Values / Maximum Values

The location analysis is conducted on a regional level. In Germany, these regions are for example the administrative districts and the urban municipalities.

The conditions in the European Union countries, and in the regions within these countries, are highly diverse. This will become apparent from the minimum values and the maximum values of the important location variables for this typical high-tech enterprise.

<b>Variable</b>	<b>Minimum</b>	<b>Maximum</b>
Payments in the manufacturing sector	369	5784
Productivity in the manufacturing sector	13423	108218
Working hours in the manufacturing sector	1401	1930
Distance from university electro-technology/automation	0	350
Corporate taxes	0	38.7
Distance from motorway	0	1529
Distance from international airport	0	1480
Percentage of workers in the manufacturing sector	0.0531	0.3268
Crime rate	15.5	33
Corruption	3.5	9.7
Growth indicator	1.4516	56.5161
Birth rate	4.5662	17.4786

The employee payments in the manufacturing sector, i.e. the gross earnings and gross salaries plus the employers' social insurance contributions, range from 369.-- euros to 5784.-- euros per month.

The productivity in the manufacturing sector, measured by the gross value added in the manufacturing sector per employee and year which is weighted by the economic purchasing power factor, ranges from 13,424.-- to 108,218.-- purchasing power standards.

The number of working hours per employee in the manufacturing sector ranges from 1401 to 1930 hours per year.

The longest distance of a region to another region with a university that has an electro-technology and/or automation department is 350 kilometres.

The corporate taxes, taxes on corporate profits (in Germany e.g. corporate income tax and trade tax) range from 0% to 38.7%. Distributed profits are not taken into consideration. The tax rate of 0% (Estonia) is an exception insofar as kept profits are not taxed and only the distribution is taxable.

The maximum distance of a region to a motorway is 1529 kilometres.

The maximum distance of a region to an international airport is 1480 kilometres.

The percentage of employees in the manufacturing sector in the economically active population ranges from 5% to 32%.

The crime rates range from 15.5% to 33%.

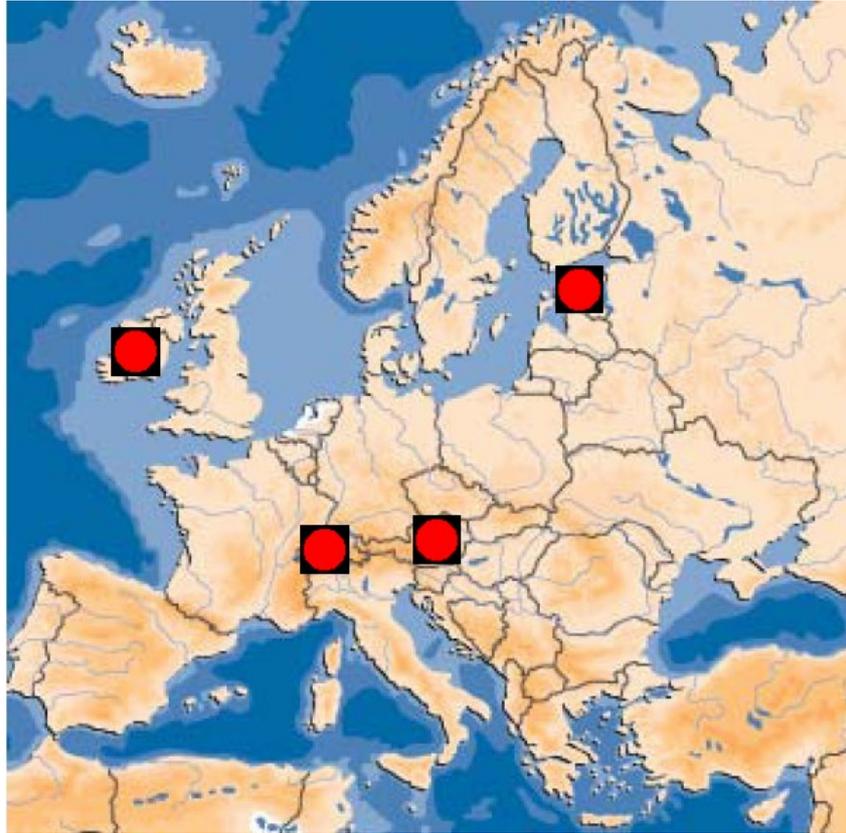
The corruption in the European countries ranges from 3.5 to 9.7 on a scale from 0 to 10. In this scale, 0 means "highly corrupt" and 10 means "not corrupt".

The competitiveness of the countries ranges from 1.45 to 56.52 on a scale from 1 to 100. In this scale, 1 means "highly competitive" and 100 means "not competitive".

The birth rates in the regions range from 4.1 to 19 live births per 1000 inhabitants.

### 3 The Comparison

The best regions:



It is the aim of this analysis to compare the St. Gall Rhine Valley with the 10 best regions of the European Union and the three best regions of Germany and Austria. The analysis came to the conclusion that all of these regions, apart from the best regions of Germany, are very close to each other. For this reason, there will be no interpretation of the results of the analysis separately for the 10 best regions, the region of the St. Gall Rhine Valley, the three best regions of Austria and the three best regions of Germany.

The analysis shows that out of the 10 best regions, the 8 best regions are in Ireland. The St. Gall Rhine Valley ranks 9<sup>th</sup>. The region Põhja-Eesti in Estonia, where the capital Tallinn is located, ranks 10<sup>th</sup>. The three best regions of Austria are ranked 11<sup>th</sup> to 13<sup>th</sup>. The three best German regions are found on ranks 314, 394 and 425 of a total of 1208 European regions that were analysed.

### 3.1 Factor Total Employee Payment

Rank	Country	Region	Payments in the manufacturing sector	Productivity in the manufacturing sector	Ratio payments to productivity	Working hours in the manufacturing sector
1	Ireland	Dublin	2805	108218	0.311037679	1880
2	Ireland	Mid-East	2805	108218	0.311037679	1880
3	Ireland	Mid-West	2805	108218	0.311037679	1880
4	Ireland	South-West (IRL)	2805	108218	0.311037679	1880
5	Ireland	South-East (IRL)	2805	108218	0.311037679	1880
6	Ireland	Midland	2203	61457	0.430151827	1880
7	Ireland	Border	2203	61457	0.430151827	1880
8	Ireland	West	2203	61457	0.430151827	1880
9	Switzerland	Rhine Valley	3497	46904	0.894644963	1930
10	Estonia	Põhja-Eesti	407	13910	0.351113801	1773
11	Austria	Linz-Wels	2921	60817	0.576351628	1750
12	Austria	Rhine Valley-Lake Constance	2743	52929	0.621889936	1750
13	Austria	Steyr-Kirchdorf	2921	60817	0.576351628	1750
314	Germany	Bremen, urban municipality	3851	61164	0.755538153	1586
394	Germany	Stadtverband Saarbrücken	3368	47978	0.84238346	1586
425	Germany	Hamburg	4398	71487	0.738264957	1586

The first 8 ranks of the analysis are Irish regions. Ireland has a total of only 8 regions. The reason why Ireland is found on the first 8 ranks with all its regions could be that in a fairly small country like Ireland, the regional differences with regard to the underlying location requirements can hardly be illustrated. This may be due to the missing regional differences or due to the missing statistical description of these differences. That is clearly demonstrated by the data for Ireland.

With regard to the factor “total employee payment”, Ireland is parted in two. The ranks 1 to 5 are clearly different from the ranks 6 to 8 with regard to the variable “payments in the manufacturing sector” and “productivity in the manufacturing sector”. The best regions found on ranks 1 to 5 are located in the South-East, and the regions on ranks 6 to 8 are located in the North-West of Ireland. In the manufacturing sector, the payments in the South-East amount to approximately 2800.-- euros, and in the North-West to about 2200.-- euros. The payments in the manufacturing sector are constituted by the gross monthly earnings and the gross monthly salaries, plus the employers’ social insurance contributions. However, these employee payments, which are 25% higher in the South-East of Ireland than in the North-West, are compensated by a significantly higher productivity in the South-East.

The productivity in the South-East of Ireland is 108,000.-- purchasing power standards and is therefore significantly higher than the productivity in the North-West of the island, which is 61,000.-- purchasing power standards. The productivity is

expressed by the gross value added in the manufacturing sector per employee and year in purchasing power standards. The artificial currency “purchasing power standards” was established with regard to currency differences in the European Union, in consideration of the purchasing power differences in the European Union countries. South-East Ireland has the highest productivity in the European Union. This productivity is actually an “outlier productivity” which is considerably higher than the closest productivity numbers that are 85,000.-- in purchasing-power parities. It would be interesting to examine exactly which branches and business enterprises cause these enormously high productivities. The productivities in the North-West of Ireland are 61,000.-- in purchasing power standards and are therefore comparable to the very good European average.

In a rough review of the European productivity numbers in this range, the productivities could be roughly classified in the following ranges:

- Productivities higher than 100,000.--: “outlier productivities”
- Productivities between 65,000.-- and 85,000.--: top productivities
- Productivities between 50,000.-- and 65,000.--: good productivities
- Productivities between 40,000.-- and 50,000.--: average productivities
- Productivities below 40,000.--: low productivities

The ratio of employee payments to productivities per employee is 31% in the best regions of Ireland and 43% in the North-West of Ireland. These are clearly the best values in the region of the old European Union countries; they are at the upper limit of the new European Union countries, which are outstanding in this respect. In simple terms, the employee payments in the best regions of Ireland are 31% of the economic output per employee, and in the regions found on ranks 5 to 8, the employee payments are 43% of the economic output per employee.

The payments in the St. Gall Rhine Valley amount to approximately 3,500.-- euros and are clearly higher than in the Irish regions and also clearly higher than in the Austrian regions found on ranks 11 to 14. The Swiss value is therefore in the same range as many regions of the old European Union countries; it is, for example, comparable to the payments in the Stadtverband Saarbrücken, which is found on rank 394.

The productivity in the manufacturing sector per employee in the St. Gall Rhine Valley is about 46,000.-- expressed in purchasing-power parities. It is in the upper average range in comparison to the European Union regions. The productivity is clearly below the excellent values of the Irish regions found on ranks 1 to 8 and also clearly below the productivity in the three best regions of Austria found on ranks 11 to 14. Also in this respect, the region of St. Gall could for example be compared to the region of Stadtverband Saarbrücken, which is found on rank 394. The ratio of employee payments to productivities in the St. Gall Rhine Valley is therefore 89%. In comparison to the regions of the European Union, this is an unfavourable value, and it is therefore in the lowest third of the European Union.

The region Põhja-Eesti in Estonia, where the capital of Tallinn is located, ranks 10<sup>th</sup> in the analysis. In Tallinn, the payments in the manufacturing sector are about 400.-- euros per month. This is a very low value in the European Union countries which is slightly lower only in some regions of Latvia and Slovakia. On average, the payments in this sector in Estonia thus amount to approximately 16% of the payments in Ireland

and 12% of the payments in the St. Gall Rhine Valley. This illustrates the enormous range of wages and salaries in the European Union.

The productivity in the region of Tallinn is 14,000.-- expressed in purchasing power standards. It is therefore one of the lowest productivities in the European Union, together with the regions of Latvia.

The ratio of employee payments to productivity in Tallinn, which is 35%, shows that the great advantage this region has due to its low payments is partly compensated by the low productivity. Irish regions can, in this respect, compete with the region of Tallinn and other regions of the new European Union countries. Nevertheless, Tallinn offers an outstanding ratio of employee payments to productivity.

The Austrian regions Linz-Wels, Rhine Valley-Lake Constance and Steyr-Kirchdorf are found on ranks 11, 12 and 13.

The employee payments in the manufacturing sector in these regions range from 2,750.-- euros to 2,900.-- euros per months and are comparable to the values of the best Irish regions and to the European average value of 2,800.-- euros. It is necessary to keep in mind that the lowest values of the new European Union countries are included in this average value. When looking at the data of the old European Union countries, it becomes clear that employee payments in the Southern European regions in this sector for business enterprises are lower than in Central or Northern Europe, where there are only a few regions. There, only regions in the new German federal states offer better conditions for business enterprises.

The productivity in the regions of Austria with values between 53,000.-- and 61,000.-- in purchasing power standards is comparable to the good European values.

The ratio of employee payments to productivity in these Austrian regions is about 60%. This is a very good value in the European comparison. These Austrian regions are therefore, in simple terms, found in the upper third of the European Union and offer a good ratio of payments to productivity.

The best German regions are Bremen, which is found on rank 314, Stadtverband Saarbrücken on rank 394 and Hamburg on rank 425.

The employee payments in these German regions range from 3,400.-- euros to 4,000.-- euros per month. The payments in the manufacturing sector are therefore clearly higher than the average payments in the European Union, which amount to approximately 2,800.-- euros per month.

The productivity in the manufacturing sector per employee ranges from 48,000.-- to 72,000.-- euros in these German regions. The productivity in the best regions of Germany therefore fluctuates considerably.

The ratio of employee payments to productivity in these German regions ranges from 74% to 84%. These German regions are much worse in this respect than the best regions of Europe in Ireland, Estonia and Austria. The proportion of employee payments on the work performed, however, is more favourable than in the St. Gall Rhine Valley, which ranks 9<sup>th</sup>.

The information of the variable “working hours” is already included in the variables “payments in the manufacturing sector” and “productivity in the manufacturing sector”. Nevertheless, the variable was included in the analysis because it could for example be a synonym for the flexibility of the labour market.

The number of working hours in the manufacturing sector is 1880 hours per year in Ireland, 1930 hours in Switzerland, 1773 hours in Estonia, 1750 hours in Austria and 1586 hours in Germany. The clear disadvantages of the St. Gall Rhine Valley with regard to the ratio of employee payments to productivity compared to the other best regions of the European Union cannot be compensated by its advantages with regard to the variable “working hours”. In Germany, employees work about 22% less per year in the manufacturing sector than in Switzerland.

### 3.2 Proximity to Research and Development

The proximity to research and development is measured by the distance of a region to another region that has a university with an electro-technology and/or automation department.

Data:

Rank	Country	Region	Proximity to research and development
1	Ireland	Dublin	0
2	Ireland	Mid-East	0
3	Ireland	Mid-West	0
4	Ireland	South-West (IRL)	0
5	Ireland	South-East (IRL)	0
6	Ireland	Midland	0
7	Ireland	Border	0
8	Ireland	West	0
9	Switzerland	Rhine Valley	0
10	Estonia	Põhja-Eesti	0
11	Austria	Linz-Wels	0
12	Austria	Rhine Valley-Lake Constance	0
13	Austria	Steyr-Kirchdorf	0
314	Germany	Bremen, urban municipality	0
394	Germany	Stadtverband Saarbrücken	0
425	Germany	Hamburg	0

The consideration of these variables shows that all the best regions have a university with an electro-technology and/or automation department. These institutions can be universities, technical colleges and educational institutions that offer the corresponding degrees.

### 3.3 Corporate Taxes

The definition of the variable “corporate taxes” in Switzerland may differ from the definition in the European Union (see chapter 2.3.3 definition of corporate taxes).

In order to find major errors made in the analysis, we re-calculated the figures in a second analysis, using a different corporate tax rate for the St. Gall Rhine Valley. In the second analysis, we assumed a corporate tax of 25%. No other data were modified. In the second analysis, the St. Gall Rhine Valley lost only one rank. The St. Gall Rhine Valley ranked 10<sup>th</sup> in the second analysis and traded ranks with the region of Põhja-Eesti in Estonia.

Corporate tax rates:

Country	Region	Corporate taxes
Ireland	Dublin	12.5
Ireland	Mid-East	12.5
Ireland	Mid-West	12.5
Ireland	South-West (IRL)	12.5
Ireland	South-East (IRL)	12.5
Ireland	Midland	12.5
Ireland	Border	12.5
Ireland	West	12.5
Switzerland	Rhine Valley	20.3
Estonia	Põhja-Eesti	0
Austria	Linz-Wels	25
Austria	Rhine Valley-Lake Constance	25
Austria	Steyr-Kirchdorf	25
Germany	Bremen, urban municipality	38.7
Germany	Stadtverband Saarbrücken	38.7
Germany	Hamburg	38.7

With a tax rate of 12.5%, Ireland has the lowest corporate taxes in the old European Union countries. In this respect, Ireland can be considered an exception. In the old European Union countries, only the Austrian tax rate of 25% comes close to Ireland’s low rate. The St. Gall Rhine Valley with declared corporate taxes of 20.3% also has very attractive tax rates. Apart from Ireland, Estonia is another exception with regard to corporate taxation. In Estonia, taxes have to be paid only on distributed profits; the corporate tax is therefore 0. Germany has the highest tax rate in the European Union, with an average corporate tax rate of 38.7%.

The new European Union countries have corporate tax rates ranging from 15% to 25%, with the exception of Estonia, which has a rate of 0%. The corporate taxes in some of the old European Union countries range from 26% to 30%, for example in Finland, Sweden, Great Britain and Portugal. In Belgium, France, Spain and Germany, the corporate taxes range from 31% to 39%. Some of the countries, for example Austria and the Netherlands, have enforced or at least agreed on significant tax cuts in the last couple of years.

### 3.4 Motorway

Rank	Country	Region	Motorway
1	Ireland	Dublin	0
2	Ireland	Mid-East	0
3	Ireland	Mid-West	108.77
4	Ireland	South-West (IRL)	183.43
5	Ireland	South-East (IRL)	101.91
6	Ireland	Midland	0
7	Ireland	Border	0
8	Ireland	West	0
9	Switzerland	Rhine Valley	0
10	Estonia	Põhja-Eesti	0
11	Austria	Linz-Wels	0
12	Austria	Rhine Valley-Lake Constance	0
13	Austria	Steyr-Kirchdorf	0
314	Germany	Bremen, urban municipality	0
394	Germany	Stadtverband Saarbrücken	0
425	Germany	Hamburg	0

Apart from three Irish regions, all the best regions have access to a motorway.

With regard to the variable “motorway exit”, Central European countries like Switzerland, Austria and Germany have an advantage over border countries of the European Union like Ireland and Estonia. The central European countries are usually quite close to European suppliers and customers in comparison to the border countries of the European Union. This is furthermore supported by the well-developed central European motorway system. A look at the street map shows that the region Põhja-Eesti (Tallinn) does have a motorway exit, but that the motorway ends 30 kilometres away from Tallinn. Motorways through the other Baltic States and through Poland are rudimentary and cover only short distances. There is therefore no connection to the Central European motorway system. Ireland is similar in that respect; the country only has connected motorways in the metropolitan area of Dublin. For example, transportation by truck in the direction of Central Europe has to be done by ferries.

### 3.5 International Airport

International airports are airports in which entries and departures with all the necessary formalities (customs, immigration) are possible on a regular basis.

Data:

Rank	Country	Region	International airports
1	Ireland	Dublin	0
2	Ireland	Mid-East	30.03
3	Ireland	Mid-West	0
4	Ireland	South-West (IRL)	0
5	Ireland	South-East (IRL)	105.56
6	Ireland	Midland	82.2
7	Ireland	Border	148.29
8	Ireland	West	108.77
9	Switzerland	Rhine Valley	0
10	Estonia	Põhja-Eesti	0
11	Austria	Linz-Wels	0
12	Austria	Rhine Valley-Lake Constance	43.99
13	Austria	Steyr-Kirchdorf	43.61
314	Germany	Bremen, urban municipality	0
394	Germany	Stadtverband Saarbrücken	0
425	Germany	Hamburg	0

All the best regions have an international airport in their area or are located within a short distance from an international airport. Only three Irish regions are located more than 100 kilometres away from an international airport. In the region of the St. Gall Rhine Valley, the definition of an international airport applies to the airport “Altenrhein”. In this case, the definition was not based on the size of the airport.

### 3.6 Labour Force Potential

Data:

Rank	Country	Region	Labour force potential
1	Ireland	Dublin	0.1609788
2	Ireland	Mid-East	0.1609788
3	Ireland	Mid-West	0.1609788
4	Ireland	South-West (IRL)	0.1609788
5	Ireland	South-East (IRL)	0.1609788
6	Ireland	Midland	0.1797063
7	Ireland	Border	0.1797063
8	Ireland	West	0.1797063
9	Switzerland	Rhine Valley	0.266
10	Estonia	Põhja-Eesti	0.2021791
11	Austria	Linz-Wels	0.247586
12	Austria	Rhine Valley-Lake Constance	0.2657631
13	Austria	Steyr-Kirchdorf	0.247586
314	Germany	Bremen, urban municipality	0.2408394
394	Germany	Stadtverband Saarbrücken	0.2416737
425	Germany	Hamburg	0.147326

The labour force potential is measured by the ratio of employees in the manufacturing sector in the economically active population. It is assumed that a region with a large ratio of employees in this sector is more likely to be characterised by this branch of industry than by other branches, and that therefore quite a large number of skilled labourers is generally available. The question whether or not this

labour force potential can be realised by the individual single business enterprises is not yet answered. These questions are company-specific and thus need to be answered individually for each business enterprise.

The complete labour force potential is constituted by the directly available employees, the currently unemployed persons in a profession or branch of industry and the indirectly available employees in a branch of industry, the ratio of employees in the manufacturing sector used here. In Europe, unfortunately no unemployment data are available for individual professions or branches of industry. It has to be assumed that among the unemployed, the ratio of employees that are not suited for a high-tech enterprise is generally very large and can differ considerably from region to region. Therefore only the ratio of employees is used in the description of the labour force potential.

Of the entire economically active population, between 16% and 27% of employees work in the manufacturing sector in the described regions. The average in the European Union is 17%, which means that on average, 17% of the economically active population works in the manufacturing sector. The Irish regions are therefore in the European average, and the region Tallinn is slightly above average with 20%. These variables alone show no large labour force potential for high-tech enterprises in Ireland and, to a certain extent, in the region of Tallinn. In this respect, the St. Gall Rhine Valley, the 3 Austrian regions and the 2 German regions Bremen and Stadtverband Saarbrücken seem to be at an advantage.

### 3.7 Crime Rate

The mentioned crime rates for the countries are not official, but they are based on the analysis of interviews in which the people in the countries were asked if they had fallen victim to a criminal act within the previous 2 years. These data are considered to be more precise in international comparisons.

Data:

Rank	Country	Region	Crime rate
1	Ireland	Dublin	n.a.
2	Ireland	Mid-East	n.a.
3	Ireland	Mid-West	n.a.
4	Ireland	South-West (IRL)	n.a.
5	Ireland	South-East (IRL)	n.a.
6	Ireland	Midland	n.a.
7	Ireland	Border	n.a.
8	Ireland	West	n.a.
9	Switzerland	Rhine Valley	18.2
10	Estonia	Põhja-Eesti	33
11	Austria	Linz-Wels	18.8
12	Austria	Rhine Valley-Lake Constance	18.8
13	Austria	Steyr-Kirchdorf	18.8
314	Germany	Bremen, urban municipality	21.9
394	Germany	Stadtverband Saarbrücken	21.9
425	Germany	Hamburg	21.9

No data are available for Ireland. Switzerland has a very good value of 18.2%, which means that 18.2% of the population declared that they had fallen victim to a criminal act within the previous two years. The European Union average is 23%, and the lowest value in the European Union is 15.5%. These figures show that the crime rate in Switzerland is low. This is also true for Austria, which has a slightly higher value of 18.8%. In the German regions, the crime rate is clearly higher, with 21.9%. With 33%, Estonia clearly has the worst crime rate value in comparison to the European Union.

### 3.8 Corruption

The values used for the variable “corruption” are data taken from the “Corruption Perceptions Index 2004” published by Transparency International. 0 means “highly corrupt”, and 10 means “not corrupt”.

Data:

Rank	Country	Region	Corruption
1	Ireland	Dublin	7.5
2	Ireland	Mid-East	7.5
3	Ireland	Mid-West	7.5
4	Ireland	South-West (IRL)	7.5
5	Ireland	South-East (IRL)	7.5
6	Ireland	Midland	7.5
7	Ireland	Border	7.5
8	Ireland	West	7.5
9	Switzerland	Rhine Valley	9.1
10	Estonia	Põhja-Eesti	6
11	Austria	Linz-Wels	8.4
12	Austria	Rhine Valley-Lake Constance	8.4
13	Austria	Steyr-Kirchdorf	8.4
314	Germany	Bremen, urban municipality	8.2
394	Germany	Stadtverband Saarbrücken	8.2
425	Germany	Hamburg	8.2

In this respect, all the mentioned countries have obviously improved. This is not true for all the European Union countries.

In particular Switzerland’s excellent value of 9.1 is only surpassed in the European Union by Finland, Denmark and Sweden. Austria and Germany also have good values in this respect which are above the values of several old European Union countries. This is – with slight restrictions – also true for Ireland. Estonia shows a clearly higher corruption tendency with a value of 6. Estonia shows by far the lowest corruption tendency within the new European Union countries and is also clearly better than some of the old European Union countries like Italy.

Altogether, the factor “security”, which is constituted by the variables “crime rate” and “corruption”, favours especially Switzerland and to a – noticeably – lesser extent Austria. Austria is followed by Germany and Ireland. Estonia has by far the worst conditions of the best European Union countries as far as the factor “security” is concerned.

### 3.9 Growth Indicator

The growth indicator and the competition indicator are based on indices of the World Economic Forum which were condensed by us.

The World Economic Forum conducted studies about the competitiveness of 104 countries. The macroeconomic and microeconomic requirements for competition and growth in a country were evaluated. Both indices are constituted of a number of variables like inflation, corruption, judiciary, patent, exchange rates and many more. We condensed these indices to obtain a single value.

Data:

Rank	Country	Region	Growth indicator
1	Ireland	Dublin	25.10269
2	Ireland	Mid-East	25.10269
3	Ireland	Mid-West	25.10269
4	Ireland	South-West (IRL)	25.10269
5	Ireland	South-East (IRL)	25.10269
6	Ireland	Midland	25.10269
7	Ireland	Border	25.10269
8	Ireland	West	25.10269
9	Switzerland	Rhine Valley	6.27
10	Estonia	Põhja-Eesti	22.72218
11	Austria	Linz-Wels	15.94007
12	Austria	Rhine Valley-Lake Constance	15.94007
13	Austria	Steyr-Kirchdorf	15.94007
314	Germany	Bremen, urban municipality	7.70631
394	Germany	Stadtverband Saarbrücken	7.70631
425	Germany	Hamburg	7.70631

The economic growth in the best regions of the analysis, i.e. in Ireland, is not thought to have very bright prospects. The average value for the European Union is 18. In the new European Union countries, only Portugal, Italy and Greece have worse values. This shows that the growth prospects in Ireland are below average and that reforms are necessary in this respect. Even in Estonia, the growth prospects are estimated to be slightly higher. Estonia has by far the best value of all the new European Union countries and is also better than some of the old European Union countries. Despite existing reform requirements, major reforms have already been conducted within the past years, at least in comparison with the other new European Union countries. The growth opportunities in Austria are considered to be slightly above average in comparison with the European Union. The best prospects for long-term growth seem to be present in Switzerland with a value of 6.3. In this respect, Germany also has good prospects with a value of 7.7, which is only slightly behind the Swiss value.

### 3.10 Birth Rate

The birth rate of a region is considered as an indicator for the dynamics of a population, based on the thought that a population develops more dynamically and has to develop more dynamically the higher the population growth and the birth rate of the region are.

Data:

Rank	Country	Region	Birth rate
1	Ireland	Dublin	14.77159
2	Ireland	Mid-East	16.12477
3	Ireland	Mid-West	14.1191
4	Ireland	South-West (IRL)	13.4892
5	Ireland	South-East (IRL)	14.21801
6	Ireland	Midland	14.79714
7	Ireland	Border	14.11192
8	Ireland	West	12.01201
9	Switzerland	Rhine Valley	10.18
10	Estonia	Põhja-Eesti	8.157845
11	Austria	Linz-Wels	9.693975
12	Austria	Rhine Valley-Lake Constance	11.83658
13	Austria	Steyr-Kirchdorf	10.4712
314	Germany	Bremen, urban municipality	9.043928
394	Germany	Stadtverband Saarbrücken	8.508225
425	Germany	Hamburg	9.398496

Ireland has by far the highest birth rate among the best regions, with values between 12 and 16 live births for every 1000 inhabitants. The values in the other best regions range between 8 and 10 live births for every 1000 inhabitants. Only the Rhine Valley-Lake Constance region has a slightly higher value with 12 live births for every 1000 inhabitants.

The two growth variables “growth opportunities” and “birth rate” in Ireland seem to contradict each other. While the growth indicator has to be valued rather negatively, the population growth rate rather points to a dynamically developing population. The growth indicator is constituted by several economic and political factors. An unfavourable growth indicator could mean that much work remains to be done in the areas of political and economic reforms in this region. The high birth rate could be an indicator for potential dynamic growth in the future.

The growth opportunities for Switzerland, measured by the variables “growth indicator” and “birth rate”, seem to be better than those for Austria.

In this respect, Germany is only slightly behind Switzerland.

### 3.11 Conclusion

All the best regions are very close to research and development. Therefore, this variable will not be further considered in the interpretation.

The Irish regions offer a very good ratio of employee payments to productivity that is comparable to the situation in the new European Union countries. They also offer highly advantageous corporate taxes and an excellent infrastructure, apart from the fact that they are located on an island. The labour force potential does not seem to be particularly great; the security situation of Ireland could be in the higher intermediate ranks in comparison to the European Union countries; the future prospects are not consistent. The distinct advantage of Ireland in comparison to other Western European countries therefore lies in the low costs.

The St. Gall Rhine Valley seems to reflect the direct opposite of possibilities. Here, the ratio of employee payments to productivity has to be valued negatively in comparison to Ireland, but also in comparison to the three best regions of Austria. Switzerland offers the business enterprises highly favourable corporate taxes, which, however, are still not as favourable as in Ireland; they are, however, excellent in comparison to the Western European countries. The traffic infrastructure in the St. Gall Rhine Valley is very good, the labour force potential seems to be large, the security situation is very good and the future prospects also seem to be excellent.

The region of Tallinn has a very good ratio of employee payments to productivity, very favourable corporate taxation and a very good traffic infrastructure, apart from its limited access to the Central European motorway system. The labour force potential is only average, the security situation is bad and the need for reforms still seems to be considerable. The advantages of the Tallinn region clearly lie in the low costs.

The three Austrian regions show a favourable ratio of employee payments to productivity for Western European countries, a very good traffic infrastructure, good labour force potential and a very good security situation. Only the future prospects are behind the best regions in comparison to the Western European countries.

In comparison to the best regions of the European Union, which are located in Ireland, the St. Gall Rhine Valley and in the three regions of Austria, Austria probably offers the best balanced ratio of location factors. In the regions of Ireland and the St. Gall Rhine Valley, the strengths and weaknesses are obvious.

The three best German regions offer a relatively bad ratio of employee payments to productivity. Although the ratio is better than in the St. Gall Rhine Valley, the labour market in Germany seems to be less flexible overall, measured by the number of hours worked. The corporate taxes are the highest in the European Union. The traffic infrastructure is very good but does not clearly surpass the infrastructure in other Western European countries. The labour force potential differs clearly from one region to another. The security situation is not as good as in Switzerland or Austria. Only in the variable "growth indicator" does Germany offer very good values that surpass the values of other Western European countries. Altogether this situation is reflected in the comparison with the best European regions in the fact that the best German region, namely Bremen, is found on rank 314.

## 4 Note

The data of the analysis are collected at a regional level in Europe. In Germany, for example, the administrative districts or the urban municipalities represent the lowest regional level. The districts represent the next higher regional level in Germany. The German States are located above this level.

The regions in the other European countries are basically constituted in a similar way. In some European countries, particularly in small countries, one of these levels is missing. In these cases, the data for the smallest suitable and available regional level are collected.

The sizes of the regions in Europe, which are measured by the area or the approximate diameter of a region, can differ. In Germany, a non-representative random check of the administrative districts led to the result that the East-West distance of the administrative districts ranges from 25 to 35 kilometres on average. Of course, there are also larger and smaller administrative districts. The dimension of the smallest regional level in Europe has a larger range.

In some countries, there are smaller administrative districts on average (for example in the Netherlands), while in other countries the dimension of the administrative districts is larger. Roughly, it can be assumed that the dimension of the smallest regional level in Europe ranges from 35 to 45 kilometres, but this value was only determined on the basis of a non-representative random check. All the data therefore refer to a region with a certain dimension, for example to administrative districts with a dimension of approximately 35 kilometres.

There is a certain time lag between the occurrence of the data incorporated in this analysis and their publication. This time lag can be up to 3 years and in some cases even 4 years. It is unfortunately impossible to have more current data, especially on the smallest regional level. We make every effort to keep the data as current as possible, and we update our databases once a year.

The location analysis CONTOR-REGIO is a complex method. The data have to be edited considerably. Despite a careful checking of the data before, while or after they are edited, errors can happen. Faulty data could have been transmitted to us that were impossible to spot, or errors can happen during editing that cannot be spotted either.

Before settling down and making an investment in a recommended location, it is vital to check if the location requirements illustrated in the analysis are indeed fulfilled in that region.

This analysis also uses data which were provided to us by official authorities or business enterprises or which we collected and calculated ourselves. The data are therefore within the usual statistical range. An acceptable fault tolerance cannot be guaranteed.

## Appendix: Overview of the Best Regions of the European Union

Rank	Country	Region	Payments in the manufacturing sector	Productivity in the manufacturing sector	Working hours in the manufacturing sector	Proximity to research and development	Corporate taxes	Motorway	International airports	Labour force potential	Crime rate	Corruption	Growth indicator	Birth rate
1	Ireland	Dublin	2805	108218.4	1880	0	12.5	0	0	0.1609788	n.a.	7.5	25.10269	14.77159
2	Ireland	Mid-East	2805	108218.4	1880	0	12.5	0	30.03	0.1609788	n.a.	7.5	25.10269	16.12477
3	Ireland	Mid-West	2805	108218.4	1880	0	12.5	108.77	0	0.1609788	n.a.	7.5	25.10269	14.1191
4	Ireland	South-West (IRL)	2805	108218.4	1880	0	12.5	183.43	0	0.1609788	n.a.	7.5	25.10269	13.4892
5	Ireland	South-East (IRL)	2805	108218.4	1880	0	12.5	101.91	105.56	0.1609788	n.a.	7.5	25.10269	14.21801
6	Ireland	Midland	2203	61457.37	1880	0	12.5	0	82.2	0.1797063	n.a.	7.5	25.10269	14.79714
7	Ireland	Border	2203	61457.37	1880	0	12.5	0	148.29	0.1797063	n.a.	7.5	25.10269	14.11192
8	Ireland	West	2203	61457.37	1880	0	12.5	0	108.77	0.1797063	n.a.	7.5	25.10269	12.01201
9	Switzerland	Rhine Valley	3496.86	46903.88	1930	0	20.3	0	0	0.266	18.2	9.1	6.27	10.18
10	Estonia	Põhja-Eesti	407	13910.02	1773	0	0	0	0	0.2021791	33	6	22.72218	8.157845
11	Austria	Linz-Wels	2921	60817.04	1750	0	25	0	0	0.247586	18.8	8.4	15.94007	9.693975
12	Austria	Rhine Valley-Lake Constance	2743	52929.98	1750	0	25	0	43.99	0.2657631	18.8	8.4	15.94007	11.83658
13	Austria	Steyr-Kirchdorf	2921	60817.04	1750	0	25	0	43.61	0.247586	18.8	8.4	15.94007	10.4712
314	Germany	Bremen, urban municipality	3851	61164.35	1586	0	38.7	0	0	0.2408394	21.9	8.2	7.70631	9.043928
394	Germany	Stadtverband Saarbrücken	3368	47978.15	1586	0	38.7	0	0	0.2416737	21.9	8.2	7.70631	8.508225
425	Germany	Hamburg	4398	71486.53	1586	0	38.7	0	0	0.147326	21.9	8.2	7.70631	9.398496