

Relationships between investments costs for infrastructure and for sport stadia: The case of the World Cup 2006 in Germany

Nicolas Büttner[†], Wolfgang Maennig^{††}, and Marco Messner^{†††}

April 2007

Abstract

This study uses the example of the 2006 soccer World Cup in Germany to examine whether any systematic relationships exist between infrastructure investments on the one hand and investments in the respective stadium on the other. Particular attention is paid to an examination of whether the relative infrastructure costs in the case of newly-built stadia differ from those relating to stadia that have been reconstructed or extended. Such systematic relationships, or “rules of thumb”, could be used in the future to simplify the prediction of the expected volume of necessary infrastructure measures for major sporting events (other soccer World Cups, the Olympic Games, etc.) on the basis of the investment required for the sports venues. Our study makes use of a cluster and discriminant analysis and concludes that such general rules cannot be derived from the 2006 World Cup in Germany.

JEL Classification Codes: L83, R42, R53

Keywords: Infrastructure investments, sport stadia costs, cluster analysis, discriminant analysis.

This paper is also available as University of Hamburg Working Paper Series in Economic Policy, Number 04/2005 (revised 11/06).

[†]University of Hamburg

^{††}University of Hamburg, Chair for Economic Policy, Von-Melle-Park 5, 20146 Hamburg, Germany, E-mail: maennig@econ.uni-hamburg.de, phone: +49 (0)40 42838 - 4622, fax: +49 (0)40 42838 - 6251 (corresponding author)

^{†††}University of Hamburg

Nicolas Büttner, Wolfgang Maennig*, Marco Menßen

Relationships between investments costs for infrastructure and for sport stadia:

The case of the World Cup 2006 in Germany

Abstract: This study uses the example of the 2006 soccer World Cup in Germany to examine whether any systematic relationships exist between infrastructure investments on the one hand and investments in the respective stadium on the other. Particular attention is paid to an examination of whether the relative infrastructure costs in the case of newly-built stadia differ from those relating to stadia that have been reconstructed or extended. Such systematic relationships, or “rules of thumb”, could be used in the future to simplify the prediction of the expected volume of necessary infrastructure measures for major sporting events (other soccer World Cups, the Olympic Games, etc.) on the basis of the investment required for the sports venues. Our study makes use of a cluster and discriminace analysis and concludes that such general rules cannot be derived from the 2006 World Cup in Germany.

Keywords: Infrastructure investments, sport stadia costs, cluster analysis, discriminace analysis.

JEL classification: L83, R42, R53

Version: November 2006

1 Introduction and Description of the Problem

The costs for works involved in building, reconstructing or extending the stadia for the 2006 World Cup in Germany amount to some €1.4 billion (cf. Table 1), a considerable part of which was financed by public funds. In addition to other costs such as security (Lutz, 2006), significant investments in infrastructure were required in connection with the construction work for the stadia. In this respect, Germany’s Federal Ministry of the Interior [BMI] (2004, p. 3) stated in its third research report on the preparations for the 2006 World Cup that:

* Corresponding Author. Phone: +49 (0)40 42838 - 4622; Fax: +49 (0)40 42838 - 6251. *Email Adress:* Maennig@econ.uni-hamburg.de (W. Maennig).

Transport infrastructure in Germany is fundamentally capable of dealing with a major international event such as the 2006 World Cup. [...] Some €3.4 billion have been invested solely in expanding and extending the national network of major roads, which will benefit our ability to deal with extra traffic during the 2006 World Cup. In addition, further extension and expansion measures will also be completed by 2006.

This study tests whether a systematic connection exists between the type or volume of stadium investments on the one hand and the volume of investments in related infrastructure on the other.¹ In particular an examination is undertaken of whether the relative infrastructure costs in the case of “newly-built stadia” differ systematically from those relating to “stadia reconstruction or extension works”. If a differentiation between these two groups should prove possible, it may then be possible to derive useful insights for major sporting events in the future, enabling simplified predictions about the expected volume of the required infrastructure measures based on the level of necessary investment in the sports venues.

Table A1: Costs for newly-built and reconstructed World Cup stadia and their capacities

<i>Location</i>	<i>Costs</i>						<i>Distance from previous venue</i>	<i>Capacity in Season 99/00</i>	<i>Capacity in Season 05/06</i>	<i>Capacity change</i>	<i>City inhabitants</i>
	<i>Total</i>	<i>Federal</i>	<i>State</i>	<i>City</i>	<i>Operator</i>	<i>External</i>					
Berlin	242	196.0	0.0	0.0	0.0	46.0	0	76,243	76,000	-243	3,390,000
Dortmund	36	0.0	0.0	0.0	36.0	0.0	0	68,600	83,000	14,400	590,000
Frankfurt	126	0.0	20.5	64.0	0.0	41.5	0	61,146	50,300	-10,846	650,000
Gelsenkirchen	192	0.0	0.0	0.0	33.8	158.2	0.72	62,004	61,524	-480	278,000
Hamburg	97	0.0	0.0	11.0	16.0	70.0	0	55,000	55,000	0	1,700,000
Hannover	64	0.0	0.0	24.0	0.0	40.0	0	56,000	49,000	-7,000	525,000
Kaiserslautern	48.3	0.0	21.7	7.7	18.9	0.0	0	41,582	40,721	-861	107,000
Cologne	117.5	0.0	0.0	25.5	0.0	84.5	0	46,000	50,374	4,374	1,000,000
Leipzig	90.6	0.0	0.0	63.2	27.4	0.0	0	90,000	44,345	-45,655	494,000
Munich	280	0.0	0.0	0.0	280.0	0.0	9.25	63,000	66,000	3,000	1,300,000
Nuremberg	56	0.0	28.0	28.0	0.0	0.0	0	44,600	44,308	-292	490,000
Stuttgart	51.6	0.0	15.3	36.3	0.0	0.0	0	47,000	48,500	1,500	590,000
SUM	1,401.0	196.0	85.5	259.7	412.1	440.2		711,175	669,072	---	

Source: Fédération Internationale de Football Association [FIFA] (2004) as well as Skrentny (2001). Cf. also Kicker Sonderhefte Bundesliga from the years 1995/96 (1995), 1999/2000 (1999) and

¹ This work processes data for ten of the twelve World Cup venues. The relevant sources were not available for the venues Dortmund and Frankfurt.

05/06 (2005). Distance measurements were undertaken with the aid of Google Earth. * The team VfB Leipzig was only part of the Bundesliga - Germany's football first division - for one year and was also relegated from the second division after the 95/96 season (MAENNIG, FEDDERSEN and BORCHERDING, 2005, p. 49). The spectator capacity from this season is given in Table 1 as a comparison value.

The second section provides a summary description of the investments in infrastructure and stadia in Germany for the 2006 World Cup. In sections three and four we use cluster and discriminant analysis to attempt to systematise infrastructure investments in relation to stadia investments. Section five provides a critical conclusion.

2 Infrastructure and Stadium Costs for the 2006 World Cup

Table A1 in the appendix presents all federal infrastructure measures undertaken in Germany with respect to the 2006 World Cup in the 12 venue locations. This compilation is based on the list for transport, construction and urban development of the Federal Ministry of Transport, Building and Urban Affairs [BMVBS] (BMVBS, 2005a) entitled "WM-Verkehrsprojekte des Bundes, der Länder, der Austragungsorte und der DB AG" (*World Cup transportation projects undertaken at federal, state and city level and by the German Railways*). Table A1 modifies this list by differentiating between projects determined by the World Cup and those not determined by the World Cup. This differentiation is based on the Federal Transportation Route Plan [BVWP] from the year 2003 and the relevant annexes for individual states. The BVWP 2003 groups the "urgent requirements" into "current and firmly allocated projects" and "new projects". The "current and firmly allocated projects" cover projects that were already planned in the BVWP 1991 and which are either currently in the process of enactment or due to be enacted in the near future. The corresponding projects are not determined by the World Cup since the implementation and funding decisions had already been taken before Germany's bid to host the 2006 World Cup was approved. Other measures from the "new projects" section (i.e. measures newly included in the BVWP's "urgent requirements" in the period 1991 to 2003) were added to the measures not determined by the

World Cup if they were able to justifiably be classified as non-World Cup related by the relevant contact person from the venue in question.²

The total volume of investment for the infrastructure in the ten cities examined, under consideration of BMVBS (2005a) amounts to well over €7 billion and is hence almost twice as high the corresponding figure for the BMVBS (2005b), i.e. €3.7 billion.³ The infrastructure costs for the individual venue locations displays a large spread, ranging from around €62 million in Nuremberg to almost €3 billion in Berlin (cf. Table A1).⁴ However, the example of Berlin also illustrates in a particularly clear manner the necessity of differentiating between World Cup related and non World Cup related investments. Attention should thus be drawn, for example, to projects included in Berlin's total investment volume such as the new Central Station and the North-South Tunnel which are determined by Berlin's status as capital city, rather than as host to the World Cup. A similar situation applies to Hamburg with regard to the fourth tunnel under the River Elbe and for Cologne in relation to numerous motorway projects independent of the World Cup.

If we limit ourselves only to the World Cup related projects the absolute range is reduced to €22.7 million in Hamburg to €654.4 million in Berlin, without however any significant reduction in the coefficient of variation.⁵ In addition the new figure of just under €1.6 billion for infrastructure investments now only makes up around a quarter of the sum mentioned above.

From Illustration 1, which shows the composition of the World Cup related projects we can see that in Gelsenkirchen, Hamburg, Leipzig and Munich the majority of funding is

² The "current and firmly allocated projects" listed in the BVWP 2003 include a number of projects that were realised ahead of schedule as a result of Germany's successful bid to host the 2006 World Cup, cf. information provided in a telephone conversation with Mr. Joop, Department S 10 of the BMVBS on 16.01.2006. The names of the contact persons from the individual venue locations are listed in the relevant part of Table A1 in the appendix.

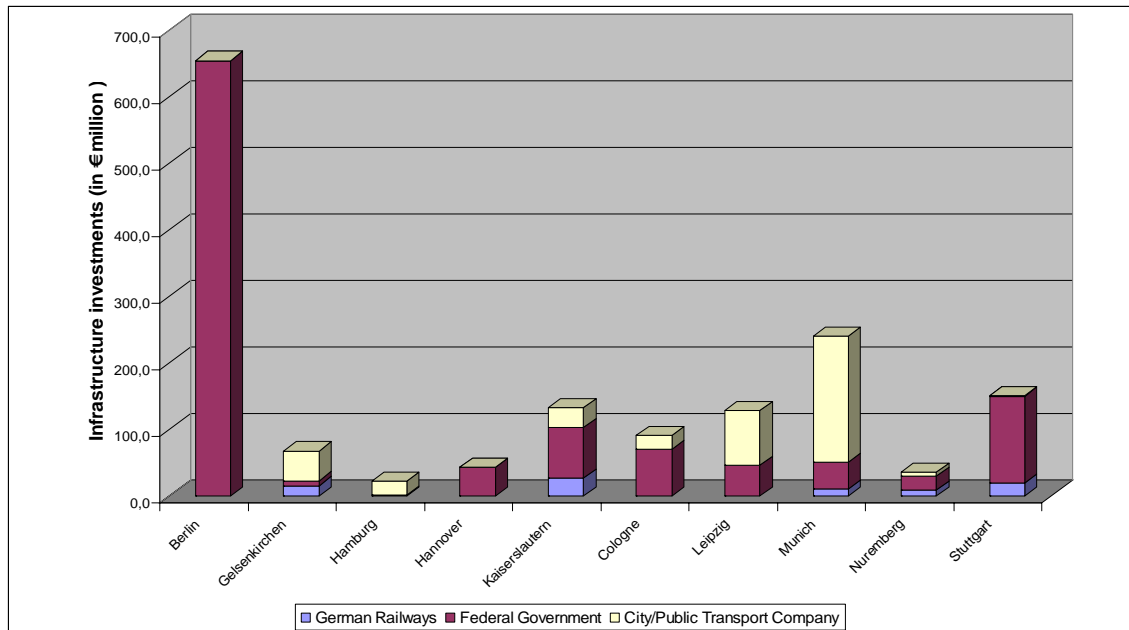
³ The investment volume of €3.7 billion given in BMVBS (2005b) was adopted and disseminated by the great majority of media in Germany. No information is available on the basis for the calculation nor on the composition of the €3.7 billion.

⁴ The coefficient of variation of the total infrastructure costs stands at 1.2.

⁵ The coefficient of variation of the World Cup related infrastructure costs stands at 1.19.

provided by the cities themselves, whereas in Hannover, Cologne, Nuremberg and Stuttgart funding is mainly provided by Federal Government. In Berlin, Federal Government funding even makes up 100% of the World Cup related infrastructure investments.

Illustration 1: Infrastructure investments in the World Cup venue locations (only World Cup related projects)

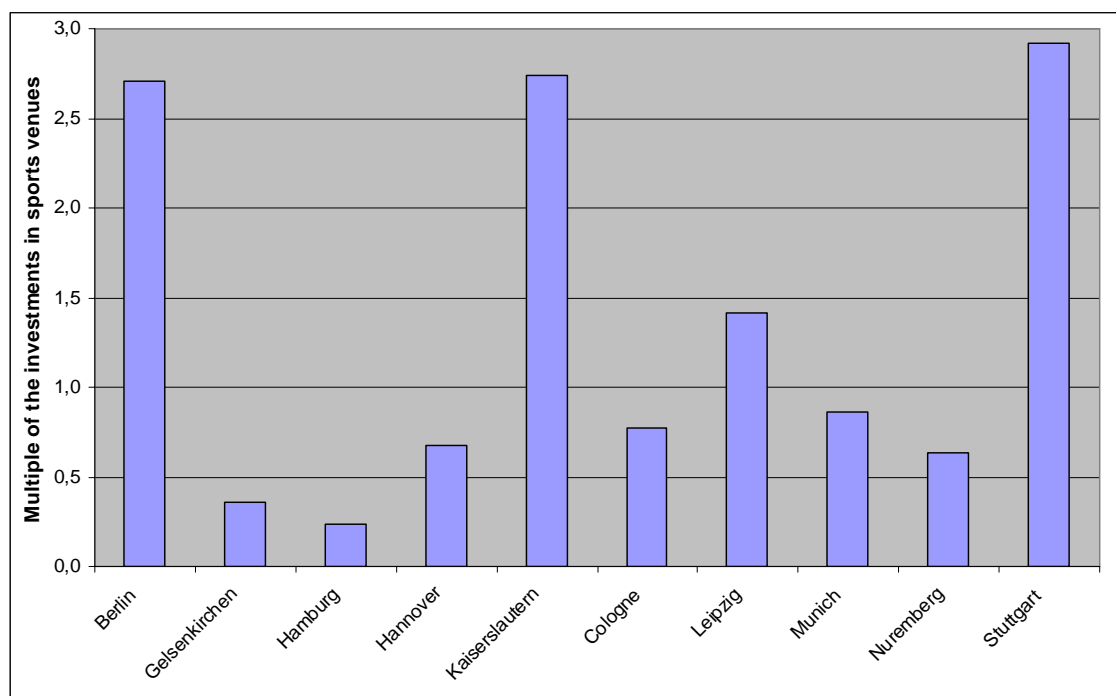


Source: See Table A1.

If the World Cup related infrastructure investments are set in relation to the expenditure for sporting venues, then Stuttgart, Kaiserslautern and Berlin display the highest values. For Stuttgart and Kaiserslautern this is due to the low costs for the reconstruction and/or extension of the individual sports venues, whilst for Berlin it can be deduced from the high investment costs in the World Cup related infrastructure. By contrast for Gelsenkirchen and Hamburg the relation is relatively low, at 0.4 and 0.2 respectively, which is a result of the high costs of the construction work for the new sports venues.

Taking into account the expenditure for sports venues and their character (new construction/reconstruction),⁶ Leipzig displays relatively high World Cup related infrastructure costs for a venue location with a newly-built stadium, whilst Hannover, Cologne and Nuremberg display low relation for venue locations with reconstructed stadia. The stadia in the last three venue locations mentioned are “quasi new buildings”, which were relatively expensive as “reconstruction works”. In the case of Hannover it should also be taken into consideration that the infrastructure had already been modernised in the run-up to the EXPO 2000.

Illustration 2: Infrastructure investments as a multiple of the investments in sports venues (only World Cup related projects)



Source: See Tables 1 and A1.

Overall it becomes clear that at €1.6 billion for ten of the twelve World Cup stadia, the infrastructure measures are more extensive and costly than the stadium investments alone (€1.4 billion for 12 stadia). When planning for large-scale sporting events the

⁶ According to the definition provided by FIFA (2004), the stadia in Gelsenkirchen, Hamburg, Leipzig and Munich were newly-built, whilst those in Berlin, Hannover, Kaiserslautern, Cologne, Nuremberg and Stuttgart were reconstructed or (in the case of Kaiserslautern), extended.

focus, which hitherto has tended to be on stadium costs, should therefore be increasingly directed towards the infrastructure. In addition it can be seen that in three of the six venue locations with stadium reconstruction or extension works (Berlin, Kaiserslautern and Stuttgart), the infrastructure costs were significantly higher than the stadium costs, whilst this was the case in only one of the four venue locations with newly-built stadia (Leipzig). This leads to the hypothesis, which we will test for below: we test the assumed differentiation by relative infrastructure costs into two groups (venue locations with newly-built stadia and venue locations with stadium reconstruction or extension works) according to the allocation undertaken by FIFA (2004).

3 Methods and Results

Due to the small data set it seems appropriate to begin testing the hypothesis of a differentiation or group formation by newly-built and reconstructed stadia with the aid of a cluster analysis. The objects of the analysis are the ten World Cup venue locations which can initially be clustered according to the parameters of investments in sports venues and infrastructure investments. Furthermore it also seems appropriate in view of the apparent connection with the investments to cluster according to the parameters of the number of city inhabitants, the capacities of the sports venues,⁷ the change in capacity of the sports venues and the distance of the venues to the respective previous venue. The sources of the relevant data can be seen in Table 1.

Given that according to Table 2, the parameter “capacity” is significantly correlated with “stadium costs”, “city inhabitants” and “infrastructure costs”, we will dispense with this parameter when performing the cluster analysis. All of the parameters are metrically scaled and were z-standardised to avoid distortions.⁸

⁷ This refers to the capacity at the start of the World Cup season 05/06 from Table 1.

⁸ The standardisation is performed with $z_{ki} = \frac{x_{ki} - \bar{x}_i}{s_i}$, whereby z_{ki} describes the value of parameter i for Object k , \bar{x}_i the mean of parameter i and s_i the standard deviation of parameter i , cf. Fisher, (1921, p. 1-32).

Table A1: Bivariate correlations of the parameters

<i>Variables</i>	<i>Correlations between the variables</i>
Stadium costs and infrastructure costs	0.622
Stadium costs and capacity	0.907 **
Stadium costs and inhabitants	0.586
Stadium costs and capacity change	0.205
Stadium costs and distance to previous venue	0.676 *
Infrastructure costs and capacity	0.735 *
Infrastructure costs and inhabitants	0.814 **
Infrastructure costs and capacity change	0.082
Infrastructure costs and distance to previous venue	0.145
Capacity and inhabitants	0.793 **
Capacity and capacity change	0.321
Capacity and distance to previous venue	0.414
Inhabitants and capacity change	0.204
Inhabitants and distance to previous venue	0.087
Capacity change and distance to previous venue	0.189

Notes: * Significant at the level of 0.05 (two-sided); ** Significant at the level of 0.01 (two-sided)

Source: Author's own calculations.

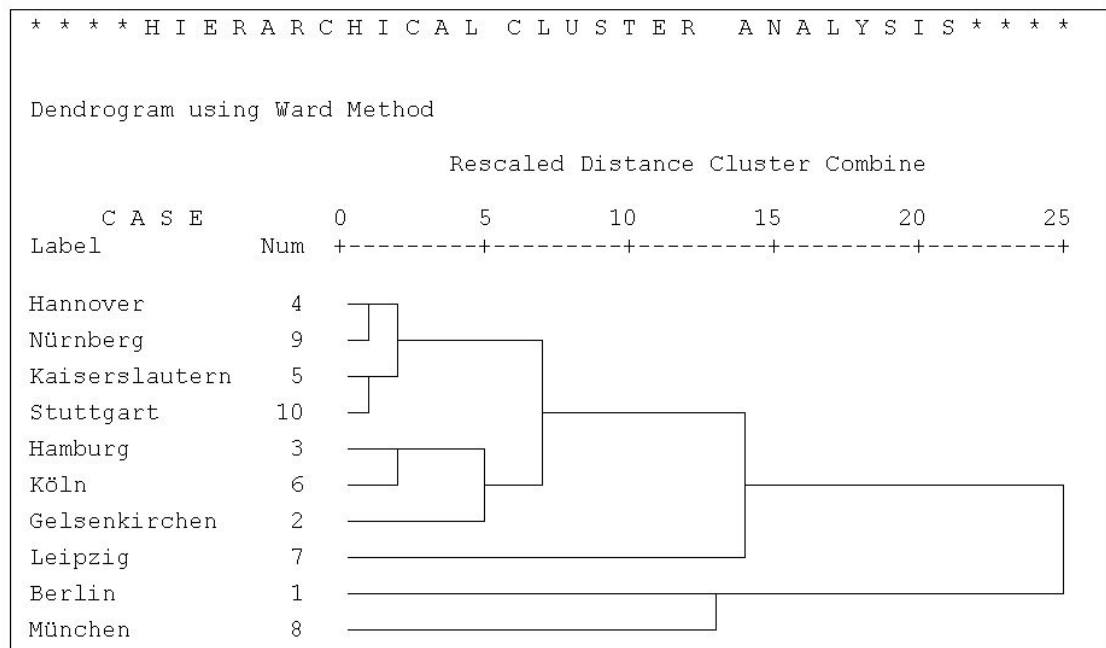
In order to attain an indicator of the “natural number” of clusters and a relatively optimal fusion algorithm for the objects, the hierarchic-agglomerative procedure according to Ward was initially used, for which the Euclidian distance was taken as a measurement of distance.⁹

The dendrogram in Illustration 3 shows that the four cities Hannover, Nuremberg, Kaiserslautern and Stuttgart, all of which have sports venues that were reconstructed or extended, were allocated to a cluster. After a relatively low increase in heterogeneity, the cities Hamburg, Cologne and Gelsenkirchen are also added to this group, whereby Hamburg and Gelsenkirchen display newly-constructed stadia, and Cologne a reconstructed stadium that however has already been identified as a de facto new stadium. After a further, relatively low increase in heterogeneity Leipzig (new stadium) is then added to the group. Only the venues Berlin and Munich are allocated to the second cluster. A separation of the two clusters according to venues with reconstructed or extended

⁹ Cf. Ward (1963, pp. 236-244) and Moray et al. (1983, pp. 325-327). The Euclidian distance is calculated with $d_2(k,l) = \sqrt{\sum_{i=1}^p (x_{ki} - x_{li})^2}$.or $d_2(k,l) = \sqrt{\sum_{i=1}^p (z_{ki} - z_{li})^2}$, since z-standardisation is used, cf. Fisher (1921, pp. 1-32).

sports venues on the one hand and newly-built sports stadia on the other can therefore not be recognised.

Illustration 3: Cluster analysis using Ward method

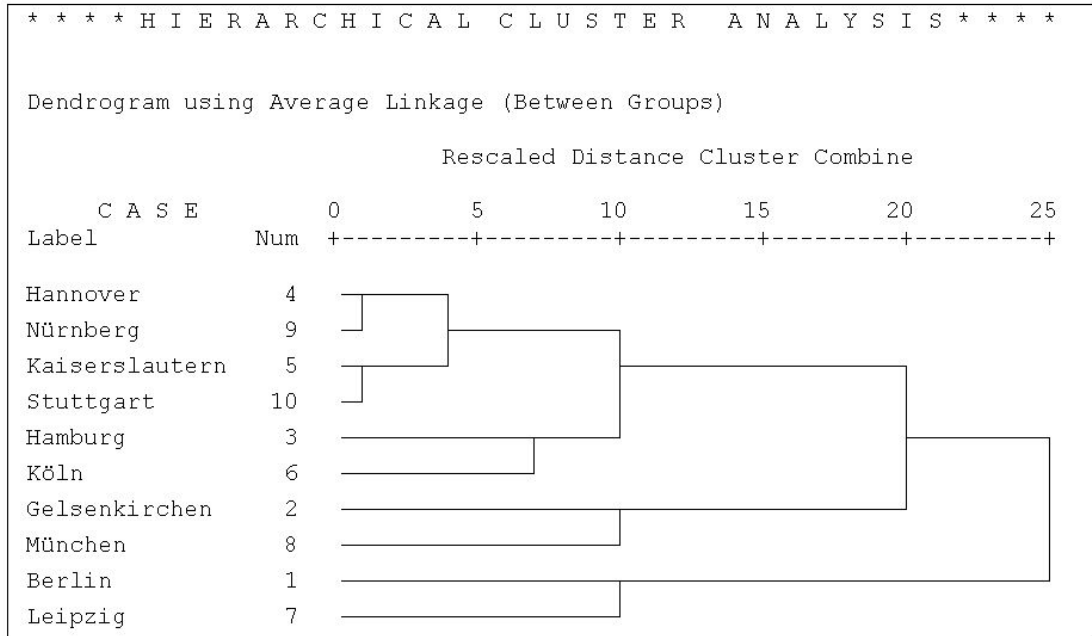


Source: Author’s own illustration.

As an alternative specification the average linking method for cluster creation was used which, like the Ward method, also represents a “conservative” method (Lance and Williams, 1966, p. 374). In addition the Q correlation coefficients were used for the measurement of distance.¹⁰ The parameters used remain the same. Illustration 4 shows the result.

¹⁰ The Q correlation coefficients are a measurement of similarity that transfers the approach developed by Bravais and Pearson to binary parameters (Gower, 1967, pp. 623-638). Although measurement of distance is usually prevalent in metrically scaled parameters, under certain conditions the measurement of similarity may be meaningful. The Q correlation coefficient is not suited to parameter values between -1 and +1 if only two variables (i.e. parameters) are being analysed. However, this is not the case here, since the five known parameters are always included in the analyses.

Illustration 4: Cluster analysis using average linkage method



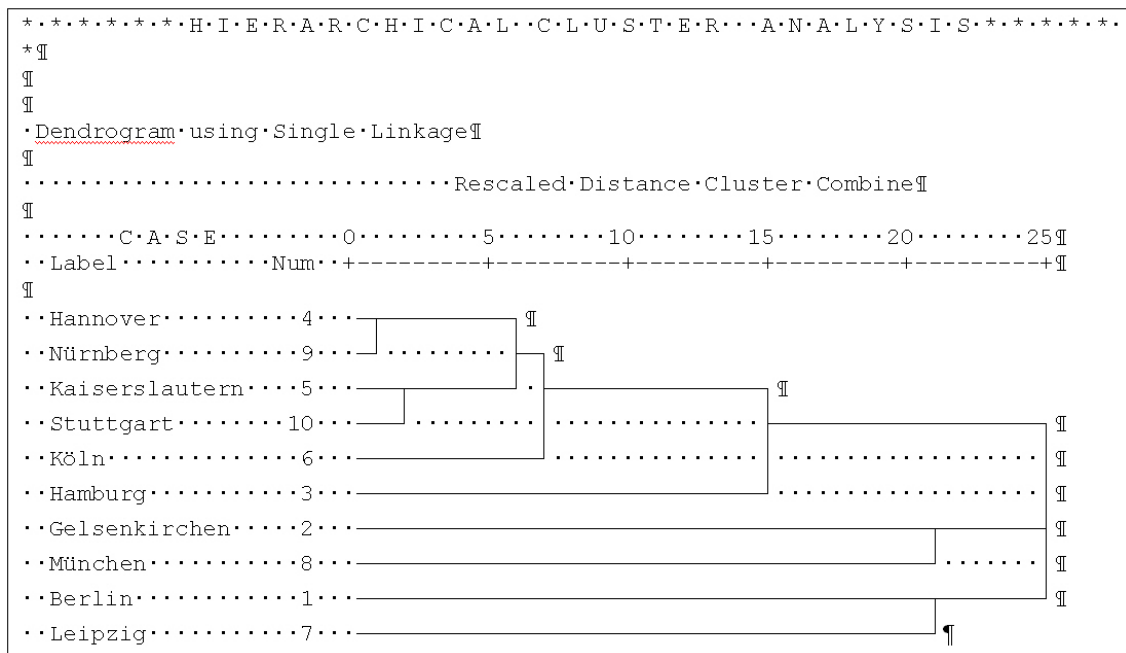
Source: Author’s own illustration.

The ten analysed sports venues now fall into three clusters, with Hannover, Nuremberg, Kaiserslautern, Stuttgart, Hamburg and Cologne forming the first cluster. Gelsenkirchen and Munich form the second cluster and Berlin and Leipzig the third. In addition one may also discern the considerable heterogeneity among the objects in the second and third clusters.

It is noticeable that the reconstruction of the Berlin Olympic Stadium can still be found in the cluster of newly-built stadia, although Hamburg’s AOL Arena by contrast is allocated to the cluster which otherwise contains reconstructed and extended stadia. Illustration 4 demonstrates the special position of Hamburg and Cologne among the World Cup venues with reconstruction or extension works, which is expressed in a higher level of heterogeneity in relation to the other cities of this cluster. A clear and unambiguous separation between cities with reconstructed or extended stadia on the one hand and newly-built stadia on the other cannot however always be depicted.

Finally the single linkage clustering (or nearest neighbour method) was used, which is particularly good at finding elongated or large area clusters.¹¹ Following Illustration 5 indicates the ten World Cup venues once again resolve into two clusters. Hannover, Nuremberg, Kaiserslautern, Stuttgart, Cologne and Hamburg are arranged in the first, whereby Hamburg is only allocated to this cluster after a conspicuous increase in heterogeneity. This can convincingly be explained by Hamburg’s particular status as newly-built stadium among the reconstruction and extension works. The second cluster contains the objects Gelsenkirchen, Munich, Berlin and Leipzig. Berlin is the only declared reconstruction in this cluster of new buildings.

Illustration 5: Cluster analysis using single linkage method



Source: Author’s own illustration.

However, this “misallocation” can also be interpreted. Berlin’s €242 million stadium reconstruction was only marginally cheaper than the most expensive newly-constructed stadium (Munich’s Allianz Arena, €280 million). The high level of heterogeneity between the individual objects of the “new stadium cluster” can clearly be seen. The clus-

¹¹ This is a contractive method, in contrast to the conservative methods of the Ward and average linking methods, cf. Lance and Williams (1966, p. 374).

ter analysis thus confirms a fundamental impression of the relations between the investments as given in Illustration 2: the heterogeneity, particularly among venue locations with new buildings, is apparently too great to be of use with regard to venue investments in making any statements about the expected volume of infrastructure investments.

The results of the cluster analyses which saw the allocation of the objects into two clusters (Ward method, single linkage method) was tested with a two-group discriminance analysis, in which as before the five independent variables: volume of sports venue investment costs, volume of World Cup related infrastructure costs, number of city inhabitants, change in stadium capacity and distance to previous venue were used, as well as a constant.

The variables were standardised in order to improve the explanatory power of the discriminance coefficients. The discriminance coefficients were normalised, because the eigenvector of the discriminance coefficients is only determinable up to an arbitrary factor. The normalisation was performed in such a way that the pooled variance of the discriminance values becomes equal to one: $(s_d^2)^{pool} = 1$. The values of the standardised discriminance coefficients in Table 3 show that the sports venue investments have the greatest discriminance power on which of the two clusters a World Cup venue is allocated to. To check whether and to what extent the correlations reported in Table 2 lead to distortions of the standardised discriminance coefficients, Table 3 also shows the corresponding structure coefficients. These clearly illustrate that the influence of the volume of stadium investment costs on the separation power of the discriminance variables tends to be biased downward, whilst the influence of the volume of infrastructure investment costs and the number of inhabitants tends to be biased upwards. Overall the volume of stadium and infrastructure investment costs have the greatest discriminance power in the separation of the two groups. However, the variables number of inhabitants, change in capacity and distance to previous sports venue display an isolated influence of at least 11%.

The eigenvalue of the discriminance criterion amounts to 30.00, the canonical correlation coefficient to 0.984 and Wilks' lambda to 0.032. At 18.887, the Bartlett chi-square

distributed test statistic is also beyond the critical value of 11.1 for $\chi^2_{(5;0.95)}$. The null hypothesis, that the discriminance function is unsuited to the separation of the two groups, should be discounted with less than 1% probability of error.

Table A1: Standardised discriminance coefficients and structure coefficients

Variable	Standardised canonical discriminance function coefficients			Structure matrix		
	Values	Percentage of the absolute values	Significance ranking	Values	Percentage of the absolute values	Significance ranking
Stadium costs	-3.996	36.14%	1	-0.234	40.67%	1
Infrastructure costs (World Cup related projects)	-1.084	9.80%	5	-0.116	20.09%	2
Inhabitants	2.169	19.62%	3	-0.064	11.10%	5
Change in capacity	2.595	23.47%	2	0.072	12.49%	4
Distance to previous sports venue	1.212	10.97%	4	-0.090	15.65%	3
Sum (of the absolute values)	11.056	100.00%		0.576	100.00%	
Test statistic	Eigenvalue		Canonical correlation coefficient	Wilks' lambda	Chi-square	Significance
Value	30.00		0.984	0.032	18.887	0.002

Source: Author's own calculations.

Overall the discriminance analysis confirms the cluster analysis according to the Ward and single linkage methods as far as the goodness of the separation between the two groups is concerned (Hannover, Nuremberg, Kaiserslautern, Stuttgart, Hamburg und Cologne one the one hand and Gelsenkirchen, Munich Berlin and Leipzig on the other). The discriminance analysis also clearly shows that the separation can primarily be deduced from the variables of the volume of stadium and infrastructure investment costs and only secondarily from the auxiliary variables of number of inhabitants, change in capacity and distance to previous venue. The intended separation of the two groups into locations with reconstructed and extended stadia on the one hand and locations with newly-built stadia on the other can evidently not be achieved, even with the aid of cluster and discriminance analyses and a number of coherent auxiliary variables.

4 Summary

The costs of the 12 stadia for the 2006 World Cup amount to some €1.4 billion. The volume of the World Cup related infrastructure investments in the 10 World Cup locations examined here amounts to some €1.57 billion.

In addition to the insights gained from the collation and systematisation of the data, the objective of this study was to discover, with a view to the planning of future large-scale sporting events, possible relationships between the type of sports venue investments and the volume of the infrastructure investments required in each case.

However, the derivation of such a set of rules entails a number of difficulties. In the case of the 2006 World Cup the variance of the infrastructure investment costs is significantly higher than that of the sports venue investments. A separation or cluster formation in newly-built stadia on the one hand and reconstructed or extended stadia on the other was unsuccessful.

In the case of the 2006 World Cup this may be due to certain particularities. Thus historical reasons meant that the sports venues in Leipzig, which actually were centrally located and had been used previously, nevertheless provided inadequate access. In Hannover the building work on the stadium, which was officially designated as a reconstruction, but which was so elaborate as to almost be a new building, benefited from a large-scale event that had taken place a few years before (the EXPO 2000).

Particularities of this kind mean that it is not directly possible to transfer the results on the infrastructure costs of the 2006 World Cup to other large-scale sporting events and/or to other nations, especially since in contrast to the soccer World Cup, many other large-scale events essentially only take place in a single location. An attempt to systematise the volume of infrastructure costs may thus be appropriate for other events and other countries.

For economic analyses the insight remains that the infrastructure costs – for the World Cup related investments chosen here – are as a rule significantly higher than the sports venue costs alone. For the planning of future major sporting venues and large-scale

events the infrastructure costs should receive more attention in comparison with the sports venue investments.

Literature

- Bross, D. (2003). Paris rückt auf der Schiene näher - Sachstand der Schienenschnellverkehrsstrecke Paris-Ostfrankreich-Südwestdeutschland (*Paris moves closer along the rails – Current state of the rapid railway connection Paris – Eastern France – Southwest Germany*) (POS), Mitteilung der Industrie- und Handelskammer Rhein-Neckar (Hrsg.) (*Notification of the Chamber of Industry and Commerce Rhein-Neckar (Ed.)*). <http://www.rhein-neckar.ihk24.de/MAIHK24/MAIHK24/produktmarken/standortpolitik/verkehrsnetze/schiene/POS.jsp> (accessed 22.09.2005).
- BMVBS (*Federal Ministry of Transport, Building and Urban Affairs*) (2005a). Verkehrsprojekte des Bundes, der Länder, der Austragungsorte und der DB AG (*Transport projects of the Federal Government, the states, the venues and the German Railways*). <https://www.bundesregierung.de/Anlage802951/Die+WM-Verkehrsprojekte.pdf> (accessed 16.03.2005).
- BMVBS (2005b). Die Verkehrsinfrastruktur zur Fußball-WM 2006 (*The transport infrastructure for the soccer 2006 World Cup*). <http://www.bmvbw.de/dokumente/-20576/Artikel/dokument.htm> (accessed 10.09.2005).
- BMI (*Federal Ministry of the Interior*) (2004). Dritter Fortschrittsbericht zur Vorbereitung auf die FIFA-Fußball-Weltmeisterschaft 2006 (*Third Research Report on the Preparations for the FIFA soccer World Cup 2006*). http://www.bmi.bund.de/cln_011/mn_189134/sid_31107E40E43C59BAA8983F21D647C319/nsc_true/Internet/Content/Common/Anlagen/Themen/Fussball-WM_2006/DatenundFakten/Dritter_Fortschrittsbericht_des_Stabs_WM_2006.templateId=raw,property=publicationFile.pdf/Dritter_Fortschrittsbericht_des_Stabs_WM_2006 (accessed 06.12.2004).
- BVWP (2003a). Grundlagen für die Zukunft der Mobilität in Deutschland - Bundesverkehrswegeplan 2003 (Anhang Land Berlin) (*Foundations for the future of mobility in Germany – Federal Transportation Route Plan 2003 (Appendix State of Berlin)*). http://www.bmvbw.de/Anlage/original_15943/Berlin.pdf (accessed 10.10.2005).
- BVWP (2003b). Grundlagen für die Zukunft der Mobilität in Deutschland - Bundesverkehrswegeplan 2003 (Anhang Land Nordrhein-Westfalen) (*Foundations for the future of mobility in Germany – Federal Transportation Route Plan 2003 (Appendix State of North-Rhein-Westphalia)*). http://www.bmvbw.de/Anlage/original_914570/Nordrhein-Westfalen.pdf (accessed 10.10.2005).
- BVWP (2003c). Grundlagen für die Zukunft der Mobilität in Deutschland - Bundesverkehrswegeplan 2003 (Anhang Land Niedersachsen) (*Foundations for the future of mobility in Germany – Federal Transportation Route Plan 2003 (Appendix State of Lower Saxony)*). http://www.bmvbw.de/Anlage/original_15937/Niedersachsen.pdf (accessed 10.10.2005).
- BVWP (2003d). Grundlagen für die Zukunft der Mobilität in Deutschland - Bundesverkehrswegeplan 2003 (Anhang Land Rheinland-Pfalz) (*Foundations for the future of mobility in Germany – Federal Transportation Route Plan 2003 (Appendix State of Rhineland-Palatinate)*). http://www.bmvbw.de/Anlage/original_15935/Rheinland-Pfalz.pdf (accessed 10.10.2005).
- BVWP (2003e). Grundlagen für die Zukunft der Mobilität in Deutschland - Bundesverkehrswegeplan 2003 (Anhang Land Sachsen) (*Foundations for the future of mobility in Germany –*

- Federal Transportation Route Plan 2003 (Appendix State of Saxony)*). [Http://www.bmwbw.de/Anlage/original_15933/Sachsen.pdf](http://www.bmwbw.de/Anlage/original_15933/Sachsen.pdf) (accessed 10.10.2005).
- BVWP (2003f). Grundlagen für die Zukunft der Mobilität in Deutschland - Bundesverkehrswegeplan 2003 (Anhang Land Bayern) (*Foundations for the future of mobility in Germany – Federal Transportation Route Plan 2003 (Appendix State of Bavaria)*). [Http://www.bmwbw.de/Anlage/original_15928/Bayern.pdf](http://www.bmwbw.de/Anlage/original_15928/Bayern.pdf) (accessed 10.10.2005).
- BVWP (2003g). Grundlagen für die Zukunft der Mobilität in Deutschland - Bundesverkehrswegeplan 2003 (Anhang Land Baden-Württemberg) (*Foundations for the future of mobility in Germany – Federal Transportation Route Plan 2003 (Appendix State of Baden-Württemberg)*). [Http://www.bmwbw.de/Anlage/ original_15927/Baden-Wuerttemberg.pdf](http://www.bmwbw.de/Anlage/original_15927/Baden-Wuerttemberg.pdf) (accessed 10.10.2005).
- Doelfs, G. (2005). Nun auch Streit um Innenausbau des Lehrter Bahnhofs (*Now there is also controversy about the interior construction work in Berlin's new Central Station*). In: „Die Welt“, 10.1.2005, <http://www.welt.de/data/2005/01/10/386287.html> (accessed 22.09.2005).
- Erb, W.-D. (1990). Anwendung der linearen Diskriminanzanalyse in Geographie und Regionalwissenschaft (*Using linear discriminance analysis in geography and regional science*). In: Schriften des Zentrums für regionale Entwicklungsforschung der Justus- Liebig-Universität Gießen (39), Verlag Weltarchiv, Hamburg.
- FIFA (2004). Auf nach Deutschland, Stadien, (*Off to Germany, Stadia*). [Http://www.ok2006.de/stadien/index.html](http://www.ok2006.de/stadien/index.html) (accessed 12.05.2004).
- Fisher, R. A. (1921). On the probable error of a coefficient of correlation deduced from a small sample. In: *Metron Journal*, 1921, 1 (4) pp. 1-32.
- Glahn, H. (2003). Bahnhof wird nachhaltig aufgewertet - nicht nur für die WM (*Train station will be refurbished for the long term, not just for the World Cup*), Pressemitteilung des Ministeriums für Wirtschaft, Verkehr, Landwirtschaft und Weinbau (Rheinland-Pfalz) (*Press release of the Ministry for the Economy, Transport, Agriculture and Viticulture (Rhineland-Palatinate)*), Stiftstraße 9, 55116 Mainz (Ed.). [Http://www.mwvlw.rlp.de/Inhalt/etc/presse/4731W260903075125.htm](http://www.mwvlw.rlp.de/Inhalt/etc/presse/4731W260903075125.htm) (accessed 22.09.2005).
- Gower, J. C. (1967). A Comparison of some methods of cluster analysis. In: *Biometrics*, 1967, 23, pp. 623-638.
- Kicker Sportmagazin (1995). Sonderheft Bundesliga 1995/96 (*Special Edition on the German Football League 1995/96*), Olympia-Verlag GmbH, Nuremberg.
- Kicker Sportmagazin (2000). Sonderheft Bundesliga 1999/2000 (*Special Edition on the German Football League 1999/2000*), Olympia-Verlag GmbH, Nuremberg.
- Kicker Sportmagazin (2005). Sonderheft Bundesliga 05/06 (*Special Edition on the German Football League 05/06*), Olympia-Verlag GmbH, Nuremberg.
- Lutz, M. (2006). Schäuble will AWACS-Flüge bei der Fußball-WM (*Interior Minister Schäuble wants AWACS flights for the soccer World Cup*). In: „Die Welt“, 5.1. 2006, <http://www.welt.de/data/2006/01/05/827056.html> (accessed 09.01.2006).
- Maennig, W. et al. (2005). Zur Evaluierung des Neuigkeitswertes von Stadienneubauten, unveröffentlichtes Gutachten für Bundesinstitut für Sportwissenschaft (*On the evaluation of the novelty value of newly-built stadia, unpublished expert report for the Federal Institute for Sports Science*).
- Morey, L. C. et al. (1983). A Comparison of Cluster Analysis Techniques Within a Sequential Validation Framework. In: *Multivariate Behavioral Research*, 1983, 18, pp. 309-329.

- N.N. (2003). Beschlussdrucksache 2655/2003 der Landeshauptstadt (LHS) Hannover zu Stadtbahnstrecke A-Süd, DB-Strecke Hannover-Weetzen - Umsteigeanlage Bahnhof Linden (*Resolution 2655/2003 of the State Capital Hannover on the city railway line A-South, DB line Hannover-Weetzen – Interchange station Linden*), LHS Hannover (Ed.). <https://e-government.hannover-stadt.de/lhhsimwebre.nsf/Tagesordnung/A08BA75A15F8B572C1256DF200136C56?OpenDocument> (accessed 10.10.2005).
- N.N. (2005a). Neubau Fernbahntunnel Berlin Tiergarten und Landwehrkanal (*New construction of the intercity railway tunnel Berlin Tiergarten and the Landwehr Canal*). Techdata/Emch+Berger (Eds.) http://emchberger.de/standorte/techdata/pdf/nord_sued_berlin.pdf (accessed 07.10.2005).
- N.N. (2005b). Fernbahnstrecke Nord-Süd-Verbindung (*Intercity line North-South connection*). Berlin, Techdata/Emch+Berger (Eds.). http://emchberger.de/standorte/techdata/pdf/nord_sued_berlin.pdf (accessed 07.10.2005).
- N.N. (2005c). Bahnhof Berlin Papestraße (*Berlin Papestrasse Railway Station*). Techdata/Emch+Berger (Eds.). http://emchberger.de/standorte/techdata/pdf/bahnhof_berlin_papestrasse.pdf (accessed 07.10.2005).
- N.N. (2005d). Neubau der Umsteigeanlage S-Bahn - Stadtbahn Hannover - Linden/Ricklingen (*New construction of the city railway interchange for the city railway line Hannover to Linden/Ricklingen*). Region Hannover (Ed.). http://www.infra-hannover.de/downloads/Flyer_NeubauStadtbahn_kl.pdf (accessed 07.10.2005).
- N.N. (2005e). S-Bahn-Verlängerung Kaiserslautern bis Homburg kommt (*The extension of the city railway from Kaiserslautern to Homburg is coming*). Mitteilung der Christlich Demokratischen Union Deutschlands (CDU), Gemeindeverband Mandelbachtal (Ed.) (*Notification of the Christian Democratic Union of Germany (CDU), party branch Mandelbachtal*), news item from 12.07.2005, <http://www.cdu-mandelbachtal.de/service/nachricht.php?NID=1518> (accessed 22.09.2005).
- N.N. (2005f). Verkehrspolitik/S-Bahn München (*Transport Policy/Munich city railway*), Press Release no. 50593 from 17th May 2005 of the Bayerisches Staatsministeriums für Wirtschaft, Infrastruktur, Verkehr und Technologie (Pressearchive) (*Bavarian State Ministry for the Economy, Infrastructure, Transport and Technology (Press Archive)*). <http://www.stmwivt.bayern.de/presse/pressearchive/ab2001/2005/05/pm50593.html> (accessed 10.10.2005).
- Skrentny, W. (2001). Das große Buch der deutschen Fußball Stadien (2. Aufl.) (*The big book of German football stadia (2nd edition)*). Verlag Die Werkstatt, Göttingen.
- Stockmann, U. (2005). Europas Mitte - Herausforderung Infrastruktur (*Europe's centre – the infrastructure challenge*), Edition 2/2005. http://ulrich-stockmann.de/upload/europas_mitte_02-2006.pdf (accessed 07.10.2005).
- Ward, H. D. (1963). Hierarchical grouping to optimize an objective function. In: Journal of the American Statistical Association, 1963, 58, pp. 236-244.

Source: Cf. BVWP (20003a, p. 97), Doelfs (2005, p. 1), Stockmann (2005, p. 4), N.N. (2005a, p. 1), N.N. (2005b, p. 1), N.N. (2005c, p. 1), email from the BVG (Berlin Public Transport), Mrs. Rubbel, from 11.08.2005 as well as information by telephone from Department S 10 of the BMVBS, Mr. Joop, from 12.08.2005. According to information by telephone from DB Netz & Betrieb (German Railways Network and Operation), Mr. Zimmermann, from 26.09.2005, the collated cost data on the German Railway's public transport projects are too low. However, the German Railways were not able to provide their own cost estimates for the projects in Berlin.

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 1)

Location	Sector	Allocation	No.	Name	Responsible	Costs (in € million)	
Gelsenkirchen	public transport	World Cup related	1	Gelsenkirchen Central Station, station redesign	German Railways/State	15.7	
			2	Central Station, reconstruction of the platforms to enable 2 double traction trains to stop	City of Gelsenkirchen/ BOGESTRA	2.5	
			3	Overhead electrical cables for Line 302, double traction trains incl. disabled access, Buer, bus station	City of Gelsenkirchen/ BOGESTRA	7.0	
			4	Additional platform for the city railway station Arena Auf Schalke	BOGESTRA	1.0	
			5	Roofing of the city railway station Arena Auf Schalke	City of Gelsenkirchen/ BOGESTRA	2.5	
		Sum					28.7
	private transport	World Cup related	1	A2 junction Essen/Gladbeck - junction Gelsenkirchen/Buer - reconstruction of the junction Essen-Gladbeck A2/B224 (6-lane extension)	Federal Government	7.5	
			2	A42 new construction of the junction Schalke (No.17) to relieve junction Gelsenkirchen-Bismark (No. 18), Gelsenkirchen-Schalke (No.16, the City Center) and Gelsenkirchen-Buer (A2, No.6), improved access to Arena auf Schalke.	City of Gelsenkirchen	22.4	
			3	Vinckestrarre (B226), improving performance (access road to the Arena).	City of Gelsenkirchen	2.6	
			4	Uferstrasse, between Kurt Schumacher-Str. (L608) and Grothusstr. (L633), improvement in the crossing area, Arena access road.	City of Gelsenkirchen	4.3	
			5	Optimisation of transport processes, improvement in transport management and signals.	City of Gelsenkirchen	2.5	
		Sum					39.3
		non World Cup related	1	A2 Gelsenkirchen-Buer-junction Herten (6-lane expansion)	Federal Government	45.9	
		Sum					45.9
		Sum					85.2
Total Sum Gelsenkirchen						113.9	

Source: Cf. BVWP (2003b, pp. 123-125). Information by telephone from the City of Gelsenkirchen, Mr. Konnietzka, from 30.04.2005.

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 2)

Location	Sector	Allocation	No.	Name	Responsible	Costs (in € million)
Hamburg	public transport	World Cup related	1	City railway, modernisation of Stellingen station	German Railways Station & Service	1.9

		2	Improvement in access from the city railway station Stellingen to the stadium	City of Hamburg	1.8	
		3	Improving attractiveness of the connection between the city railway station Stellingen and the shuttle bus line	City of Hamburg	4.0	
		4	Reconstruction of the square in front of Othmarschen station and creation of a bus shuttle to the stadium	City of Hamburg	0.5	
		Sum				8.2
	non World Cup related	1	Renovation of the railway bridge Reichsbahnstrasse and modernisation of Eidelstedt station	German Railways	0.8	
		2		Flughafen Hamburg GmbH (Hamburg Airport)	Not available/ not a World Cup project according to the City of Hamburg	
			Airport Terminal 2 extension, Airport forecourt roads			0.8
		Sum				0.8
		Sum				9.0
private transport	World Cup related	1	Expansion Sylvesterallee for buses, taxis and pedestrians	City of Hamburg	0.6	
		2	Expansion Hellgrundweg	City of Hamburg	0.6	
		3	Expansion Stadionstrasse	City of Hamburg	0.3	
		4	Reconstruction of the junction Hamburg Volkspark on the A7 including reconstruction Schnackenburgsallee	Federal Government/ Hamburg	2.7	
		5	New construction of a bus parking area with approx. 70 places in the Schnackenburgsallee	City of Hamburg	1.9	
		6	Interim bus parking area (approx. 300 places)	City of Hamburg	1.0	
		7	Sign posting of the Arena in the city network	City of Hamburg	0.2	
		8	Additional cameras for traffic management around the Arena (motorway junction Northwest, junction Volkspark)	City of Hamburg	0.3	
		9	Dynamic parking system for the Arena	City of Hamburg	0.8	
		10	Networking of the operative traffic management centres	City of Hamburg	0.0	
		11	Bilingual (German/English) city public transport direction system	City of Hamburg	0.0	
		12	Internet platform for the 2006 World Cup (Verkehrsinformations-Hamburg.de)	City of Hamburg	0.1	
		13	Improving accessibility for parking areas around the stadium including refurbishment of approx. 8,000 parking places and improvement of a pedestrian access route from the car park to the stadium	City of Hamburg	6.1	
				Sum		
	non World Cup related	1	A7 Hamburg-Othmarschen - Hamburg-Waltershof (additional 4th tunnel for the Elbe tunnel), 8-lane expansion (tunnel construction)	Federal Government	874.3	
		2	Bypass Fuhlsbüttel (1st + 2nd construction stages), 4-lane connection to airport	Federal Government	223.9	
		Sum			1 098.2	
		Sum			1 112.7	
Total Sum Hamburg					1 121.7	

Source: Cf. Notification from the Authority for Urban Planning and the Environment (BSU) Hamburg, Mr. Welschinger, from 26.07.2005 as well as BMVBS (2005a, pp.123-125).

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 3)

<i>Location</i>	<i>Sector</i>	<i>Allocation</i>	<i>No.</i>	<i>Name</i>	<i>Responsible</i>	<i>Costs (in € million)</i>
Hannover	public transport	World Cup related	1	Passenger information and directing as a city railway security, direction and information system as well as passenger directing at the city railway stations	German Railways/ City of Hannover	0.0
			Sum			0.0
		non World Cup related	1	Reconstruction of the passenger interchange at Linden station	German Railways	25.6
		Sum			25.6	
	Sum					25.6
	private transport	World Cup related	1	A7 motorway junction Hannover North - junction Grossburgwedel (PART)	Federal Government	0.2
			2	A7 junction Grossburgwedel- motorway interchange Hannover-Kirchhorst (PART)	Federal Government	9.6
			3	A7 motorway interchange Kirchhorst - motorway interchange Hannover Ost (PART)	Federal Government	5.1
			4	A7 motorway interchange Hannover Ost - junction Hildesheim	Federal Government	28.1
			Sum			43.0
		non World Cup related	1	A2 motorway interchange Hannover Ost - Marienborn L-GR NI/ST	Federal Government	685.0
			2	A7 motorway junction Hannover North - junction Grossburgwedel (PART)	Federal Government	31.0
			3	A7 junction Grossburgwedel- motorway interchange Hannover-Kirchhorst (PART)	Federal Government	21.1
			4	A7 motorway interchange Kirchhorst - motorway interchange Hannover Ost (PART)	Federal Government	21.1
			5	B217 bypass Weetzen Evestorf	Federal Government	32.0
Sum					790.2	
Sum					833.2	
Total Sum Hannover						833.2

Source: Cf. BVWP (2003c, pp. 115-116), N.N. (2003, pp. 1-2), N.N. (2005d, p. 2), information from the Department of "Coordination and Citizens' Service" of the City of Hannover, Mr. Sonnenberg, from 30.04.2005, as well as information by telephone from 11./12.08.2005 from Department S 10 of the BMVBS, Mr. Joop.

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 4)

<i>Location</i>	<i>Sector</i>	<i>Allocation</i>	<i>No.</i>	<i>Name</i>	<i>Responsible</i>	<i>Costs (in € million)</i>
Kaiserslautern	public transport	World Cup related	1	Reconstruction of the Central Station with a direct pedestrian path to the stadium and construction of platform 4	German Railways, Investor "Betze-Galerie"	5.0
			2	Redesign of the square in front of the station with central bus station	City of Kaiserslautern	10.0
			3	Regional and City railway Rhein-Neckar	German Railways	7.0
			4	Extension of the city railway line beyond Kaiserslautern to Homburg	Federal Government, State, German Railways	15.5
			Sum			37.5
	non World Cup related	1	Paris-East France-Southwest Germany railway line (POS) on the German side	German Railways	270.0	
	Sum				270.0	
	Sum					307.5
	private transport	World Cup related	1	A 63 (PART)	Federal Government	75.6

3	North Expressway: expansion of the Mainzer Strasse; 4-lane expansion of the Mainzer Strasse (partly completed)	City of Kaiserslautern	3.0
4	South Expressway: expansion of the Zolamtstrasse, expansion of a city road and a previously private German Railways area to form a 2 lane roadway (length approx 950 m.). Construction of a roundabout at the junction with the Bremerstrasse. Connection to the Trippstadter Strasse with traffic light controlled junction.	City of Kaiserslautern	2.3
5	South Expressway: expansion of the crossing Logenstrasse/Eisenbahnstrasse, expansion of the crossing in the context of the South Expressway project. The crossing is expanded with turn-off lanes and traffic lights.	City of Kaiserslautern	1.0
6	Expansion of the Pirmasenser Strasse: complete reconstruction of the heavily damaged street with park areas, pedestrian footways and cycling traffic lights	City of Kaiserslautern	0.6
7	South Expressway: 4-lane expansion of the Dammstrasse in the context of the South Expressway project (length approx. 500m). The street is widened to the north (German Railways property) and the railway bridge demolished. The measure comprises connection with the crossing Brandenburger Strasse/Hohenecker Strasse and junction with the Königstrasse (both with traffic lights).	City of Kaiserslautern	4.8
8	Expansion of the Eisenbahnstrasse: the Eisenbahnstrasse is the main connecting road between the Fritz-Walter Stadium and the inner city area. In the remaining section it is to be expanded between Karl-Marx-Strasse and Logenstrasse (including park areas and pedestrian paths).	City of Kaiserslautern	1.0
9	South Expressway: expansion of the crossing Logenstrasse/Rudolf-Breitscheid-Str., expansion of the crossing in the context of the South Expressway project. The crossing is to be expanded with turn-off lanes and traffic lights. The measure to be completed in advance as part of the subsidy planning for the expansion of the Rudolf-Breitscheid-Strasse.	City of Kaiserslautern	0.7
10	Completion of the redesign of the pedestrian precinct: the pedestrian precinct had already been redesigned over recent years in the sections Fackelstrasse and Riesenstrasse. The remaining section in the Marktstrasse should be completed by the 2006 World Cup.	City of Kaiserslautern	1.2
11	Redesign of the Willy-Brandt-Platz (square in front of the town hall): elimination of building deficiencies (PART)	City of Kaiserslautern	0.4
12	Creation of a city information system: this should be completed by the 2006 World Cup and provide information to visitors at entrances to the city and in the inner city area .	City of Kaiserslautern	0.4
13	Bus parking area Bremerstrasse: the surface of the bus parking area is to be renewed. A stairway to be built between the bus parking area and the stadium. Bus parking area Kniebrech: surface to be renewed.	City of Kaiserslautern	0.2
14	Reconstruction and renovation of the roads and footpaths around the stadium	City of Kaiserslautern	0.7
15	Construction of the "Schweinsdell" car park with 2600 spaces directly by the A6	City of Kaiserslautern	2.5

		16	Opening of the military exit as additional motorway exit for a direct connection to the "Schweinsdell" Park and Ride area (Kaiserslautern East).	City of Kaiserslautern	0.5
		17	Rendering of the car park surface in IG-North	City of Kaiserslautern	0.1
		Sum			95.0
	non World Cup related	1			not available/ not a World Cup project according to the City of Kaiserslautern
		2	A6 Kaiserslautern West - junction Landstuhl	Federal Government	not available/ not a World Cup project according to the City of Kaiserslautern
		3	B270 A6 Siegelbach	Federal Government	of Kaiserslautern
		4	A 63 (PART)	Federal Government	21.9
		5	B 37 bypass Hochspeyer	Federal Government	15.3
		6	North Expressway: 4-lane expansion of the Ludwigstrasse	City of Kaiserslautern	3.9
		6	Redesign of the Willy-Brandt-Platz (square in front of the town hall): elimination of construction deficiencies (PART)	City of Kaiserslautern	0.3
		Sum			41.4
		Sum			136.4
Total Sum Kaiserslautern					443.9

Source: Cf. BVWP (2003d, p. 132), Glahn (2003, p. 1), Bross (2003), N.N. (2005e), notification from the Department of Law and Order – Traffic Authority of the City of Kaiserslautern, Mr. Dressing from 26.07.2005 and information by telephone from 11./12.08.2005 from Department S 10 of the BMVBS, Mr. Joop. Two private transport projects listed under (2005a, p. 11), the expansion of the A6 Kaiserslautern West - junction Landstuhl as well as the connection of the B270 to the A6 near Siegelbach, are completely unrelated to the 2006 World Cup according to the City of Kaiserslautern and for this reason are not even listed here under the summary including the non World Cup related projects.

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 5)

Location	Sector	Allocation	No.	Name	Responsible	Costs (in € million)
Cologne	public transport	non World Cup related	1	Inclusion of the Cologne/Bonn Airport in the German Railway's intercity network and Cologne's city railway network	German Railways	19,1
			2	Reconstruction of the city railway station RheinEnergie Stadium, extension of city railway line 1 and connection with planned city railway station Bonnstrasse	City of Cologne, German Railways	6.9
			3	City railway connection Cologne/Bonn Airport – planned city railway station Bonnstrasse	VRS, State of NRW	3.0
			4	Construction of the city railway station Bonnstrasse with related measures including extension of city railway line 1 to city railway station Bonnstrasse and creation of the P+R area with	City of Cologne, German Railways, VRS, State of	7.1

		400 spaces	NRW	
		Installation of a direction system at the public transport connections and at stops from where the RheinEnergie Stadium can be reached on foot	City of Cologne, German Railways, VRS	3.8
		5		
		Sum		39.9
private transport	World Cup related	1 A4 new junction Bonnstr. (L 183) in sector Frechen, new construction	Federal Government	3.0
		2 A3 motorway interchange Cologne-East - motorway junction Heumar, 8-lane expansion	Federal Government	67.0 Contained in no. 3 (public transport)
		3 P+R area Bonnstr., 1st building stage	City of Cologne	
		4 Expansion of the traffic management system to the area of the stadium: dynamic traffic information and directions, pedestrian direction system and local resident protection plans	City of Cologne	0.6
		5 Dürener Str. (B 264) from Marsdorfer Str. to the federal motorway A1	City of Cologne	9.8
		6 Cycle and pedestrian paths around the stadium	Kölner Sportstätten GmbH (Cologne Sports Venues)	0.4
		7 Dynamic traffic information and directions	City of Cologne	1.3
		8 Inclusion of the stadium car parks in the car park traffic direction system	City of Cologne	Contained in no. 7
		9 Dürener Str. from Salzburger Weg to Marsdorfer Str. (3-lane expansion) including lane signalling system	Landesbetrieb Straßenbau NRW (NRW state-run road construction company)	1.6
		10 Renovation of roads and paths around the stadium	City of Cologne	1.3
		11 Construction and rebuilding work on the stadium car parks as well as measures to redesign the area around the stadium	Kölner Sportstätten GmbH (Cologne Sports Venues)	6.0
		Sum		90.9
	non World Cup related	1 A1 motorway interchange Cologne-North-German Railways Aachen-Cologne line, 6-lane expansion	Federal Government	99.0
		2 A1 German Railways Aachen-Cologne line - motorway interchange Cologne-West, 6-lane expansion	Federal Government	106.0
		3 A4 junction Weisweiler - junction Düren (m) (o Rur bridge), 6-lane expansion	Federal Government	46.6
		4 A4 motorway interchange Kerpen - motorway interchange Cologne-West, 6-lane expansion	Federal Government	78.0
		5 A1 junction Remscheid - TR Remscheid, 6-lane expansion	Federal Government	32.9
		6 A4 junction Eschweiler - junction Weisweiler, 6-lane expansion	Federal Government	46.5
		7 Cycle/pedestrian path from Schulstr. to Bonnstr.	City of Cologne	0.1
		8 Expansion of the traffic management system to the area of the stadium: dynamic traffic information and directions, pedestrian direction system and local resident protection plan	City of Cologne	0.2
		Sum		409.3
		Sum		500.2
Total Sum Cologne				540.1

Source: Cf. BVWP (2003b, pp. 123-125) as well as information from the Office of Urban Development and Statistics of the City of Cologne, Mr. Kolm, from 08.07.2005 and from 18.01.2006. Cf. information from the Office of Urban Development and Statistics of the City of Cologne, Herr Kolm, from 18.01.2006. According to the City of Cologne, the extensions with regard to the BMVBS (2005a, pp.13-14) are World Cup related projects under the responsibility of the Landesbetrieb Straßenbau NRW (*North-Rhine-Westphalia state-run road construction company*), the City of Cologne and the (*Cologne Sports Venues*). The City of Cologne bears a proportion of approx. €14 million of the overall infrastructure costs. If calculations are based just on the World Cup related projects, the City of Cologne's share is still some €10.9 million.

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 6)

Location	Sector	Allocation	No.	Name	Responsible	Costs (in € million)
Leipzig	private transport	World Cup related	1	A14 motorway interchange Schkeuditz - junction Central Leipzig, 6-lane expansion and overhaul with hard shoulder extension	Federal Government	46.7
			2	S1, relocation south of Lindenthal (motorway access road to the A 14, Leipzig North)	State of Saxony	1.6
			3	S1, relocation north of Lindenthal (motorway access road to the A 14, Leipzig North)	State of Saxony	Contained in no. 2
			4	S 8a western airport approach road	State of Saxony	Contained in no. 2
			5	S38a, relocation near Liebertwolkwitz	State of Saxony	Contained in no. 2
			6	S 43 new, expansion near Großpösna	State of Saxony	Contained in no. 2
			7	Marschnerstrasse from Käthe-Kollwitz-Str. to Ferdinand-Lassalle-Strasse	City of Leipzig	0.8
			8	Expansion of junction Leutzscher Allee/Waldstrasse	City of Leipzig	1.5
			9	Junction Leutzscher Allee/ Friedrich-Ebert-Str. (roundabout)	City of Leipzig	0.4
			10	Rückmarsdorfer Strasse with bridge over German Railway facilities	City of Leipzig	5.8
			11	Junction Merseburger Str./Hupfeldstr. as well as Merseburger Str./Rückmarsdorfer Str.	City of Leipzig	3.1
			12	Jahnallee from Zeppelinbrücke-Leibnizstr.-Rosenthal	City of Leipzig	25.3
			13	Junction Goerdelerring	City of Leipzig	4.0
			14	Johannisplatz	City of Leipzig	5.4
			15	Pragerstr./city railway line 15 with Prager Brücke (Section Kregelstr. - An der Tabaksmühle)	City of Leipzig	14.8
			16	Expansion of the Lützener Str. between Zschochersche Str. and Odermannstr.	City of Leipzig	1.5
			17	Friedrich-Ebert-Str. - Westplatz	City of Leipzig	2.7
			18	Station Angerbrücke	LVB GmbH	4.0
			19	Willy-Brandt-Platz	LVB GmbH	10.7
Sum						128.3
		non World Cup related	1	A38 southern ring road Leipzig: junction Leipzig Southwest (B186) - junction Leipzig South (B2/B95), construction of new 4-lane section	Federal Government	155.9
			2	A72 BA: junction Borna North - junction Borna South (bypass Borna) construction of new 4-lane section	Federal Government	12.9
			3	A72 BA 1.1: motorway interchange Chemnitz (A4/A72) to Hartmannsdorf, construction of new 4-lane section	Federal Government	53.0
			4	A72 construction stage 1.2: Hartmannsdorf - Niederfrohna, construction of new 4-lane section	Federal Government	45.0
			5	A14, junction Central Leipzig - junction Leipzig-Messegelände	Federal Government	49.4

	6	A38 South ring road Leipzig: junction Leipzig-South - junction Leipzig-Southeast, construction of new 4-lane section	Federal Government	52.3
	7	A38 South ring road Leipzig: junction Leipzig-Southeast - motorway junction Parthenaue, construction of new 4-lane section	Federal Government	49.2
	8	North Expressway Schönefeld with Hermann-Liebmann-Bridge	City of Leipzig	34.1
	9	Eisenbahnstr. (from Rosa-Luxemburg-Strasse - Torgastrasse)	City of Leipzig	4.3
		Sum		456.1
		Sum		584.3
Total Sum Leipzig				584.3

Source: Cf. BVWP (2003e, pp. 138-139), information from the Building Department of the City of Leipzig on the World Cup transport projects under the responsibility of the City of Leipzig from 24.06.2005 as well as information by telephone from 11./12.08.2005 from Department S 10 of the BMVBS, Mr. Joop. Since the City of Leipzig was not able to provide any information on measures under the responsibility of the Leipziger Verkehrsbetriebe (*Leipzig Transport Companies*) [LVB], 13 public transport measures that are listed in BMVBS (2005a, p. 15) are not taken into consideration in the above table. This means that the investment sum for transport infrastructure measures in the World Cup location Leipzig is on the low side.

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 7)

Location	Sector	Allocation	No.	Name	Responsible	Costs (in € million)
Munich	public transport	World Cup related	1	Installation of a traveller information system (DEFAS) and a direction system at all connection points	City of Munich / German Railways	11.0
			2	Underground line 6: extension and expansion of Fröttmaning station, line refurbishment to cope with a capacity of 20,880 persons per hour, expansion and extension of the connecting station Marienplatz, creation of a passenger information system	MVV	98.6
			Sum			109.6
	private transport	World Cup related	1	Installation of a traffic direction system and its connection with the traffic management network on the federal major road network	City of Munich / Federal Government; AV Bayern	14.6
			2	Construction of a main road between the A9 (junction-Munich-Fröttmaning) and the A99 (partial connection stadium)	City of Munich	50.1
			3	A9, reconstruction of the junction Munich Fröttmaning	Federal Government/City of Munich	6.9
			4	A99, reconstruction westbound motorway interchange Munich-North (partial connection stadium)	Neubau (Kostenträger Stadt)	19.8
			5	A9 motorway interchange Neufahrn motorway interchange; A9 Munich North; motorway interchange Munich North - junction Munich Frankfurter Ring	Federal Government	39.3
			Sum			130.7
		non World Cup related	1	A99 Langwied (A8) - Unterpfaffenhofen (A96) m junction Germering	Federal Government	30.9
		Sum				30.9
		Sum				161.6
Total Sum Munich						271.2

Source: Cf. BVWP (2003f, pp. 87-88), N.N. (2005f) as well as information from the District Administration Department of the State Capital Munich, Mr. Reif, on World Cup projects under the responsibility of the City of Munich from 24.05.2005.

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 8)

Location	Sector	Allocation	No.	Name	Responsible	Costs (in € million)	
Nuremberg	public transport	World Cup related	1	Expansion des city railway station Franken Stadium and increase in capacity to 15200 persons per hour – construction of a new special platform	German Railways	8.5	
			2	Construction of a direction system from the relevant public transport stops to the stadium and back	City of Nuremberg, VGN, VAG, German Railways	Stadium; contained in measure 5 (IV)	
			3	Creation of an intermodal travel schedule information service that can be accessed via PDA and UMTS mobile phones	VGN, German Railways, Free State of Bavaria	0.1	
			4	Dynamic destination display (DEFIS) at selected stops	VAG	1.9	
			5	Dynamic transmission of video images between VAG and the police	VAG	0.1	
			Sum				10.6
		private transport	World Cup related	1	A6 motorway interchange Nuremberg/South (flyover)	Federal Government	21.0
	2			Refurbishment/reinforcement of roads and car parks in the area directly around the stadium (VIP parking area, stadium forecourt, parking direction system pylons, car park S2, car park S5, Hans-Kalb-Strasse/Karl-Steigelmann-Strasse, street lighting, cycle stands, Max-Morlock-Platz	City of Nuremberg	2.7	
	3			Connecting the motorway management's traffic computer center to the police's city traffic center and the City's traffic computer	Federal Government/AV Bavaria, City of Nuremberg	Contained in measure 3	
	4			Installation of a dynamic parking direction system	City of Nuremberg	Contained in measure 3	
	5			Installation (improvement) of a pedestrian direction system from the car parks to the stadium	City of Nuremberg	0.2	
	6			Expansion of the Gleiwitzerstr. between Breslauer Str. and K.-Schönleben-Str.	City of Nuremberg	1.0	
	7			Additional right-turn lane from the Breslauer Str. into the Regensburger Str.	Nuremberg Department of Roadworks	0.2	
			Sum				25.1
			non World Cup related	1	Completion of a dynamic traffic direction system leading from the federal motorway network via the inner-city road network to the car parks around the stadium; including renewed expansion of the traffic direction system	Federal Government, Free State of Bavaria, City of Nuremberg	26.5
		Sum				26.5	
		Sum				51.6	
Total Sum Nuremberg						62.1	

Source: Cf. Information from the Economics Department about the World Cup related transport projects under the responsibility of the City of Nuremberg, Mr. Jülich, from 25.07.2005 and from 17.01.2006. The costs for the two supplemented infrastructure measures in the public transport sector, both of which were the responsibility of the Nuremberg Transport Company VAG, were provided by the Economics Department of the City of Nuremberg. According to information from the City of Nuremberg from 17.01.2006, these are World Cup related projects. In addition the

City of Nuremberg differs from the BMVBS (2005a, p. 18) in listing 16 instead of eight infrastructure measures in the private transport sector. Of the 16 stated private transport projects, nine were however listed under No.2 of the World Cup related projects and two under No. 1 of the non World Cup related projects in Table 2, so that the total number of eight infrastructure measures in the private transport sector given by BMVBS (2005a, p. 18) remains.

Table A1: Infrastructure costs of the individual World Cup locations (Cntd. 9)

<i>Location</i>	<i>Sector</i>	<i>Allocation</i>	<i>No.</i>	<i>Name</i>	<i>Responsible</i>	<i>Costs (in € million)</i>	
Stuttgart	public transport	World Cup related	1	Modernisation of the city railway station Gottlieb-Daimler-Stadium, expansion of the station, construction of a second platform.	German Railways/ City of Stuttgart	10.5	
			2	Modernisation of the station Stuttgart-Bad-Cannstatt	German Railways/ State	9.5	
	Sum						20.0
	private transport	World Cup related	1	A8 junction-Wurmberg-junction Heimsheim, 6-lane expansion	Federal Government	77.0	
			2	B14 extension in Stuttgart (Südheimer Platz-Schattenring) construction of new 4-lane section (PART)	Federal Government	53.1	
			3	Completion of the junction of the Martin-Schrenk-Weg to the Benzstrasse.	LHS Stuttgart	0.1	
			4	Re-signing of "ball" to "stadium" pictogram	LHS Stuttgart	0.1	
			5	Pedestrian direction system in Bad Cannstatt	LHS Stuttgart	0.2	
			6	Emergency management	LHS Stuttgart	0.1	
			Sum				
		non World Cup related	1	B14 extension in Stuttgart (Südheimer Platz-Schattenring) construction of new 4-lane section (PART)	Federal Government	5.4	
	Sum						5.4
	Sum						135.9
	Total Sum Stuttgart						155.9

Source: Cf. BVWP (2003g, pp. 79-80) as well as information from the Economics Department on the World Cup transport projects under the responsibility of the LHS (*State Capital*) Stuttgart, Mrs. Delarue from 15.07.2005. Three additional projects were also supplemented for Stuttgart (cf. Nuremberg). The costs for these three infrastructure measures in the private transport sector, all of which were under Stuttgart's responsibility, were provided by the Office for Public Order of the LHS Stuttgart. According to this information, the projects were World Cup related.