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Appendices
to the report on
evaluation of the
6 applications for
the GSM2 licence
in Ireland

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Final version

Confidential

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2. The methodology applied

2.1 Introduction

This appendix aims at describing the methodology and evaluation techniques applied in order to arrive at the results of the evaluation. Initially, a description is provided as to how the evaluators have laid down the work in such a way that the criteria of success concerning the project are met to a reasonable degree.

2.2 The success criteria

Focusing specifically on the evaluation phase of the GSM2 tender, the criteria of success have especially been centralised around the following three categories:

- ③ Timely deliveries. In principle, the deliveries of the PT GSM should not be a critical path, although the Irish GSM2 tender has not been run as an EU tender.
- ③ Procedural effectiveness, i.e. compliance with the licensing principles of the best application method, according to which the procedures should be transparent, objective and non-discriminative. By strictly following these general principles, it should also be ensured, to the highest extent possible, that no successful litigation or complaints could be pursued by the applicants ex post.
- ③ Substantial effectiveness, i.e. successful introduction of cellular competition (GSM). Provided that the Irish GSM2 has been based on the method best application, it is unequally important to nominate and select a candidate that can compete efficiently and effectively in the market-place.

These areas of focus are commented below. Before the more specific comments are introduced (chapter 5), a general overview of the evaluation process is provided (chapter 3) together with specific comments on how the best application method has been applied during the Irish GSM2 tender.

2.3 A general outline of the conduct of the competition process

The evaluation process outlined below covers the period from May 1995 to October 1995.

The organisation

The Department of Transport, Energy and Communications has had the overall responsibility for the conduct of the competition. The drafting of this report as well as the provision of advice during the tender has been the responsibility of Andersen Management International.

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requirement was negotiated with the Commission whereby the second GSM operator would volunteer a licence fee in the range of IR£ 5 million to IR£ 15 million and Éircell would pay a fee of IR£ 10 million. This approach was endorsed by Commissioner van Miert on 14 July.

In this way, Ireland became the first EU member state to receive a prior consent from the Commission on the agreed fee structure. The Department then re-opened the competition process with August 4, 1995 as the new closing date.

On the closing date, the Department received 6 applications plus a preliminary GSM business case description from Éircell, which is already in commercial operation with a GSM (1) system. The Department and Éircell agreed that this description was insufficient to meet the need of the Department, and subsequently Éircell submitted on 11 August, 1995, a more detailed business case description following the mandatory tables. Since this "application" is not mandatory, it has not been subject to a comparative evaluation. However, the GSM business case information provided by Éircell has been used as a valuable reference point and served comparative purposes, when judged relevant.

All the GSM2 applications received were admitted to the evaluation, as none of the applications have such substantial deviations from the minimum requirements of the RFP document that they were to be rejected. With a view to making comparative evaluations, it appeared at an early stage in the evaluation that some of the applications had prepared insufficient information.

In accordance with the provision made in paragraph 16 of the RFP document, it was thus decided to pose a number of tailor-made written questions to the applications, and these questions were forwarded to the applicants on 24 August. The answers received on 4 September revealed that this part of the process had resulted in valuable improvements of the basis for comparisons. For example, a number of questions on metering and billing principles demonstrated that the different applications have used widely different assumptions concerning the charge units (time-true per second billing or billing in increments of, say, 10 seconds) and concerning initial call charge (ranging from no charge to 30 seconds independently of the actual duration of the call).

A large part of the quantifiable side of the applications was then compiled and put into graphics in order to serve as a background for the evaluation.

The marking and the nomination of the best application

The nucleus of the evaluation was then commenced by the establishment of 10 sub-groups each dealing with one of the dimensions outlined in paragraph 19 of the RFP document, namely market development, coverage, tariffs, international roaming plans, radio network architecture, network capacity, frequency efficiency, performance guarantees, financial key figures, and experience. This approach was agreed prior to the closing date and is also part of the evaluation model adopted, see appendix 3, except for the evaluation of the licence fee offered, which did not require sub-group meetings. Each sub-group comprised members from the Department and consultants from Andersen Management International. In addition, the Department of Finance participated in the sub-groups on financial key figures and performance guarantees. The sub-groups were staffed such that they comprised

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different members and affiliates of the PT GSM with specific expertise in relation to the subjects to be evaluated:

An invitation was issued on 5 September to each of the six applicants to attend a presentation meeting with the PT GSM. The invitation incorporated an agenda for the presentation and a number of questions to be responded to. This was done on an equal basis to all such that one hour was reserved to a presentation of the business case behind the application, one hour was offered to answer questions, which were equally posed and worded to all applicants, and one hour was reserved for the PT GSM to pose questions to the applications. The presentation meetings were consecutively held as 6 separate meetings from 11 - 14 September.

After the presentation, the remaining part of the evaluation was conducted, in particular on credibility, risks and sensitivities, and the overall evaluation and final marking of the applications were completed.

An initial draft report was discussed by the PT GSM on 9 October. The incorporation of comments on the initial and a subsequent draft by members of the team in relation to the presentation of the results of the evaluation process has culminated in this final report. This report reflects the consensus view of the PT GSM as to how the results of the evaluation should be presented in the final report.

2.4 The evaluation model and techniques

Prior to the closing date, the PT GSM had discussions on how to evaluate the application. It was agreed to proceed as follows:

- ⊕ The general method to be used is the so-called best application method, which is often dubbed "beauty contest". This method has been recommended repeatedly by the Commission and in its green paper on mobile communications as the best among several licensing methods. Basically, this method requires that the nominated and selected winner is the best application.
- ⊕ 'Best' should be measured against the criteria outlined in paragraph 19 of the RFP document. More specifically, each criterion was broken down into dimensions and indicators. In addition, the PT GSM adopted a weighting of the dimensions, which was in compliance with the descending order of priority by which the criteria of paragraph 19 of the RFP document were listed.

The PT GSM then requested the Andersen team to draft a memorandum on the evaluation model to be applied prior to the first closing date on 23 June, 1995. At that time, there was no limitation on the amount to be offered to the right to the GSM2 licence. Thus, the evaluation model should include some degree of quantitative evaluation in order to avoid a situation where the Irish Government could easily be accused of having prioritised the fee aspect higher than the ranking as the fourth criteria stated in paragraph 19 of the RFP document. The resulting document is basically appendix 3.

By the change of fee structure, cf. section 2.3 above, the PT GSM decided to slightly change the relative weighting of tariffs and the licence fee such that the li-

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cence fee should count for 11% (instead of 14%) and that tariffs should count for 18% (instead of 15%). The new weighting was, like the initial weighting, still in accordance with the ranking of the criteria outlined in paragraph 19 of the RFP document.

Essentially, the evaluators decided that all the results of the evaluation should be presented in one comprehensive report, as is the case with the main report such that the results of the evaluation (both quantitative and qualitative techniques) should be presented in an integrated fashion. No changes were made in the memorandum, but it was decided that the qualitative evaluation should be the decisive and prioritised part of the evaluation.

Furthermore, it became clear during the evaluation that a number of indicators in the quantitative evaluation were either impossible or difficult to score, e.g. the following:

- ⊗ It was impossible to score the international roaming indicator due to lack of adequate information on the number of roaming agreements.
- ⊗ Having requested more comparable information concerning blocking and drop out rates, it turned out by means of a supplementary analysis, cf. appendix 5, that the information provided was incomparable by nature and too heavily influenced by arbitrary assumption, imponderables, and optimistic versus pessimistic approaches.
- ⊗ Concerning tariffs it turned out that 2 applicants, namely A4 and A6, have provided wrong information and, furthermore, that A1, A6 and partly A5 have been compared with the rest on an incomparable basis, as A2, A3 and A4 all suggest metering and billing principles, which do indeed increase the actual bill, the customers have to pay for the specified amount of traffic. For this reason, it would be unfair to the applicants to award marks to only one single indicator (the OECD-like) basket, without taking all the other tariff aspects into consideration.
- ⊗ The licence fee payment did not discriminate among the applicants at all.

Having realised this, the evaluator decided that the foundation for a separate quantitative evaluation had withered away. As the memorandum on the evaluation had not been changed, it was checked (page 1, indents 4 and 5, and pages 10-11, indents 5, 6, 7 and 8) that this was also consistent with the memorandum.

Consequently, the evaluators have used the information generated by the number crunching of the mandatory tables and other quantification as valuable input in the integrated, holistic evaluation. In the main report this is reflected in particular in chapter 4 in several ways: One is that quantification appears as tables, graphics, figures, etc. Another is that all the clearly quantifiable indicators have been taken into consideration and have been scored:

- ⊗ The demand indicators (number of SIM cards and amount of billable traffic) form part of the 10 indicators of the market development dimension.

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- ② The speed and extent of demographical coverage for class IV (2W) terminals outdoors form part of the roll-out indicator, one of 4 indicators of the coverage dimension.
- ② The price of the OECD-like basket is one of 9 indicators of the tariff dimension.
- ② The number of roaming agreement is not an integral part of the evaluation, since it has not been possible to score this indicator. The indicator has thus been deleted which is in accordance with the evaluation memorandum.
- ② The number of cells appears as one of 6 indicators of the dimension radio network architecture.
- ② The reserve capacity is one of 4 indicators of the dimension network capacity.
- ② Following the decision stated in the evaluation memorandum, project performance rather than quality of service, has been the object of evaluation under the dimension performance guarantees. Therefore, the quality of service parameters, measured by the blocking and drop out rates, have not been directly included in the evaluation at all, cf. the conclusion of the supplementary analysis presented in appendix 5.
- ② The frequency economy factor appears as one of 4 indicators of the dimension frequency efficiency.
- ② The number of network occurrences appears as one of 4 indicators under the dimension management aspects.
- ② The licence fee payment appears both an indicator and a dimension. Essentially, this means that this dimension/indicator is easy to score and it is the most obvious indicator for a quantitative evaluation. However, it has been easy to score this dimension/indicator, since all the applicants have offered the maximum level of payment, i.e. IR£ 15 million.
- ② Both solvency and IRR appear as indicators among a total of 8 indicators defined under the finance dimension.

As illuminated above, all the indicators defined for quantification have been taken into consideration, and, in compliance with the evaluation memorandum, all the eligible indicators have been taken into consideration in the holistic evaluation.

Thus, the quantitative analysis is based on extracting from the applications the "hard" quantitative commitments in relation to critical indicators associated with the selection criteria prescribed in the tender document. It is thus limited to clearly identifiable figures as expressed by applicants and does not have the capacity to take account of considerations such as market research, planning, management preparedness, credibility, etc. In the event following receipt of the applications, it became clear that a number of 14 indicators in the qualitative model were either impossible or difficult to score.

The qualitative model differs from the quantitative in that it allows a more holistic comparison of the critical elements of the applicants. In accordance with the evalua-

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tion document agreed prior to the close of the competition, the indicators for the model under the 10 dimensions were expanded to a total of 56, taking account of critical but non-quantifiable aspects of applications such as performance guaranties, cell planning, market research, understanding of roaming, special tariff provisions, customer care, etc.

The techniques applied in the holistic evaluation can be described by a mainly heuristic methodology as follows: Assessments by consensus among the evaluations, elaborate evaluation analyses by means of qualitative and quantitative methods, award of marks (rather the scoring by points assuming an interval scaling), and averaging of marks by consensus. This is furthermore substantiated by the marking procedures and techniques summarised below.

2.5 The marking of the applications and the nomination of the best application

The members of the sub-groups were drawn from the overall project group according to expertise relevant to the dimension under discussion in order to maximise the relevant qualifications behind each mark awarded.

The process involved the award of marks to each application under each of the ten dimensions. The marks under each dimension were developed through an assessment of the marks for each of the relevant indicators, dimensions and aspects. The process necessarily involved some degree of implicit weighting of the indicators. The result in each case was arrived at through a process of discussion and consensus within each sub-group.

In addition, also credibility, risks and sensitivities were taken into account. Therefore, apart from a detailed evaluation of marketing, technical, management and financial aspects of applications as presented by applications, the evaluation team also carried out an assessment of:

- ② The overall credibility of the applications and the consistency of the business case presented with details and assumptions elsewhere in the applications.
- ② Risk and sensitivity factors which could have the effect of derailing the business plan including, for example, failure to achieve coverage as planned or failure in the distribution channel, and
- ② Identified weaknesses in specific applications including for example basic assumptions which are considered dubious, possible conflicts of interest or financial weaknesses.

However, these factors were not directly awarded marks, because the major evaluation had already demonstrated significant differences among the applications, and because the ranking turned out to be the same as the ranking generated by the main evaluation.

The report aims at nominating and ranking the 3 best applications. This has finally been achieved through:

1. Qualitative award of marks to the six applications with respect to the 56 indicators outlined at chapter 4 of the main report.

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2. Qualitative assessment of applications according to the marketing, technical, management and financial aspects.
3. Validation and finalisation of the results through:
 - ⊕ Regrouping of the criteria to more directly reflect the selection criteria outlined at paragraph 19 of the Report.
 - ⊕ Application of the qualitative marks to the weightings agreed prior to the close of the competition for the quantitative model.
 - ⊕ Analysis of sensitivities, risks and credibility issues focusing in particular on the three best applications.
 - ⊕ Conversion of marks to points as a final check.

2.6 Final remarks

Summarising, the PT GSM has tried to obtain a high degree of temporal, procedural and substantial effectiveness by a number of means. With reference to these 3 criteria, the PT GSM will make an "evaluation-of-the-evaluation" after the nomination and selection of the best application, once the licence has been awarded.

So far, the status as per mid October 1995 is that it can be concluded that the PT GSM in the Irish GSM2 tender has achieved a high degree of temporal and procedural effectiveness. Furthermore, a high substantial effectiveness should materialise when the nominated and selected candidate is based on the best application.

3. The evaluation model

3.1 Introduction

It has been decided to apply both a quantitative and a qualitative evaluation model to the eligible applications. This document contains information concerning the quantitative and qualitative evaluation models and intends to give a complete description of these.

The document comprises two parts: The first part describes the quantitative evaluation procedure including the selection of dimensions/indicators and the scoring model. The second part is a description of the qualitative evaluation model, including the evaluation process and a guide to the award of marks.

As both the quantitative and qualitative evaluation will be performed, the guiding principle will be to work with a manageable set of aspects, which is essentially identical, i.e. marketing aspects, technical aspects, management aspects and financial aspects. In addition to these aspects, which form a common denominator in both evaluations, the qualitative evaluation also deals with the risks, i.e. the sensitivities of the business cases in relation to the evaluation criteria outlined in paragraph 19 of the RFP document.

Each aspect is broken down into dimensions and each dimension is subsequently broken down into indicators. The interplay between the quantitative and qualitative evaluation is described in section 7.

3.2 Procedure for the quantitative evaluation process

The following steps describe the procedure for the quantitative evaluation of the eligible applications:

- 1) A set of dimensions and indicators has been selected for the quantitative evaluation process. An assessment, including a point scoring method, will be defined for all indicators. The same set of dimensions, indicators and point scorings must be used for all the eligible applications.
- 2) All the selected indicators will be assigned a weighting factor. If the quantitative evaluation turns out to document that the factual basis for any part of the scoring has been wrong, a recalculated scoring will then be conducted.
- 3) The score for each indicator will be a value between 5 and 1 (both included), with 5 being the best score. All scores should be rounded to the nearest integer.
- 4) Uncertainties regarding the scoring of points may be dealt with in the qualitative evaluation.
- 5) The result of the quantitative evaluation should be considered with due respect to the significance of differences in the total sum of the points assigned.

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A memorandum comprising the salient issues of the quantitative evaluation will be annexed to the evaluation report.

3.3 Dimensions assessed in the quantitative evaluation

An overview of the selected dimensions, indicators and the relation to the RFP document paragraph 19 can be seen in the following table:

Evaluation criteria from Paragraph 19 in the RFP document	Dimensions linked to each evaluation criteria	Indicators for the dimensions
Credibility of business plan and applicant's approach to market development	Market development Experience of the applicant Financial key figures	Forecasted demand Number of network occurrences in the mobile field Solvency and IRR
Quality and viability of technical approach proposed and its compliance with the requirements set out herein	Radio network architecture Network capacity	Number of cells Reserve capacity
The approach to tariffing proposed by the applicant which must be competitive	Tariffs	Competitiveness of an OECD-like GSM2 basket
The amount the applicant is prepared to pay for the right to the licence	Licence payment	Up front licence fee payment
Timetable for achieving minimum coverage requirements and the extent to which they may be exceeded	Coverage	Speed and extend of demographical coverage of class IV (2W) handheld terminals
The extent of applicant's international roaming plan	International roaming plan	Number of international roaming agreements
The performance guarantee proposed by the applicant	Quality of service performance ¹⁾	Blocking rate and dropout rate
Efficiency of proposed use of frequency spectrum resources	Frequency efficiency	Frequency economy figure

The evaluation criteria from paragraph 19 of the RFP document are arranged in descending order of priority. This means that "Credibility of business plan and applicant's approach to market development" is the most important criterion, which is reflected in three different dimensions being linked to this evaluation criterion and the weighting of the indicators.

1) Project performance guarantee will be dealt with in the qualitative evaluation.

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The following subsections discuss the dimensions and indicators selected in accordance with paragraph 19 of the RFP document and describe the scoring model for each defined indicator.

Dimensions and indicators:

3.3.1 Dimension: Market development

Indicator: Forecasted demand

The expected capability to attract subscribers is an important and measurable dimension which can be assessed quantitatively. As an indication of the expected market development, the forecasted demand will be used as an indicator. The indicator should be assessed by ultimo 4th year of licence award. It has been decided to use the sub-indicators, which cover both the value aspect of demand (traffic generated) and the volume aspect (number of subscribers).

It has been decided to use the following scoring formula concerning the value aspect:

$$\text{Market pen. score 1} = 1 + \frac{\text{quoted no of total annual traffic minutes} - 50,000 \times 1,500}{25,000 \times 1,500}$$

With the condition that: $1 \leq \text{Market penetration score} \leq 5$

It has been decided to use the following scoring formula concerning the volume aspect:

$$\text{Market pen. score 2} = 1 + \frac{\text{quoted no of SIM cards} - 50,000}{25,000}$$

With the condition that: $1 \leq \text{Market penetration score 2} \leq 5$

In the specifications to the tender document, the required information may be found in Table 1 (item 2) and Table 4 (item 1F), regarding the number of active SIM cards and the annual billable traffic.

3.3.2 Dimension: Coverage

Indicator: Speed and extend of demographical coverage of class IV (2W) handheld terminals

Fast coverage of the population has been one of the most important factors of success for GSM systems in other countries, and this is most likely to be of similar importance for the Irish GSM systems as well. Therefore, the coverage should be assessed quantitatively using population coverage for handheld class IV (2W) terminals for outdoor use.

The scoring for the coverage indicator is a mean value taking both speed and extend into account:

$$\text{Demographical coverage score} = \frac{1}{4} \sum (\text{DCS}(\text{year}(i)), i = 1, 2, 3 \text{ and } 4)$$

where DCS(i) is given for each year based on the ultimo year demographical coverage for outdoor use class IV terminals by own network using the following curve:

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Points	Coverage year 1	Coverage year 2	Coverage year 3	Coverage year 4
1	≥ 30% and < 40%	≥ 70% and < 75%	≥ 80% and < 85%	≥ 90% and < 92%
2	≥ 40% and < 50%	≥ 75% and < 80%	≥ 85% and < 90%	≥ 92% and < 94%
3	≥ 50% and < 60%	≥ 80% and < 85%	≥ 90% and < 92%	≥ 94% and < 96%
4	≥ 60% and < 70%	≥ 85% and < 90%	≥ 92% and < 94%	≥ 96% and < 97%
5	≥ 70%	≥ 90%	≥ 94%	≥ 97%

The required information may be found in the specifications for the tender document, Table 7 Items 22 and 23.

3.3.3 Dimension: Tariffs

Indicator: Competitiveness of an OECD-like GSM2 basket

The tariffs are an important market penetration factor in any GSM market, and in addition, low tariffs will benefit the Irish customer. In order to match the average customer, the basket method can be utilised as a method for tariff comparison.

Tariffs are evaluated quantitatively by a basket, which is essentially the same tariff comparison indicator as suggested and applied by the OECD. The scoring is related to the applicant's basket ultimo year 4 compared to an identical basket of TACS 900, using the TACS 900 tariffs as of 1 January 1995.

The scoring will be defined by the following table:

Basket	Points
The GSM2 tariff basket compared to the TACS 900 basket in terms of price differences:	
≥ 40% cheaper	5
30% to 40% cheaper	4
20% to 30% cheaper	3
10% to 20% cheaper	2
0% to 10% cheaper	1

The required information and the definition of the OECD basket regarding the GSM2 applicants may be found in the specifications for the tender document, Table 8 Item 28.

3.3.4 Dimension: The applicant's international roaming plan

Indicator: Number of international roaming agreements

An important advantage of GSM over the analogue systems presently in use, is the possibilities of widespread international roaming. The extent of the applicants' international roaming plan is an important factor to include in the quantitative evaluation.

The relevant indicator is the number of international roaming agreements planned by the applicant by ultimo year 2 after the licence award. If there is no detailed infor-

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mation available on the proposed number of international roaming plans, even after presentations by the applicants; this indicator will not be scored.

If the information is available, the final score is calculated according to the following formula:

$$\text{Final score} = \text{renormalisation factor} \times \text{roaming score}$$

The roaming score is equal to the number of international roaming agreements. The renormalisation factor is common for all applications and is chosen so that:

$$\text{Factor} \times \text{roaming score} = 5$$

for the application with the **highest** roaming score.

This "renormalisation" of the score value will guarantee that the resulting final score will be between 5 and 1. An example of the renormalisation process is given below:

Applicant	Temp. score	"Factor"	Final point
A	8	5/20 or 0.25	2
B	16		4
C	20		5
D	15		3.75
E	4		1

3.3.5 Dimension: Radio network architecture

Indicator: Number of cells

The cell planning serves as important evidence of the overall quality of the cellular network, which can be compared with the targets for quality of service, making the number of cells in operation a relevant indicator. This figure is not static, so the figure quoted should be ~~ultimo~~ 4th year after licence award.

The following formula applies:

$$\text{Cells score} = 1 + \frac{\text{quoted number of cells} - 300}{150}$$

With the condition that: $1 \leq \text{Cells score} \leq 5$

The required information may be found in the specifications for the tender document, Table 20 Item 150.

3.3.6 Dimension: Reserve capacity

Indicator: Reserve capacity

The interplay between the capacity supplied by the GSM operators and the requirements from the subscribers is important when evaluating the quality and viability of the proposed technical approach. Besides from developing the network to such an extent that the demand from the subscribers can be met, the operator must also allow for a certain buffer to compensate for unexpected increases in the demand.

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The relevant indicator for this dimension is the reserve capacity, as defined in Table 16 Item 98 from the tables, the applicants are required to complete.

The following formula applies:

$$\text{Capacity score} = 1 + \frac{1}{4} \frac{\sum \text{Reserve capacity (year 2, 3, 4 and 5)} - 20\%}{10\%}$$

With the condition that: $1 \leq \text{Capacity score} \leq 5$

The capacity scores is calculated 5th year after licence award.

3.3.7 Dimension: Quality of service

Indicators: Blocking rate and dropout rate

The performance guarantee proposed by the applicant in the application will be binding in the licence agreement and is as such an important dimension which furthermore can be assessed quantitatively. For this dimension, the blocking rate and the drop out rate are the most relevant indicators.

The following scoring formulas will be used:

$$\text{Blocking rate score} = 1 + \frac{8 - \frac{1}{4} \sum \text{blocking rate (years 2, 3, 4 and 5)}}{1.1}$$

With the condition that: $1 \leq \text{Blocking rate score} \leq 5$

$$\text{Dropout rate score} = 1 + \frac{8 - \frac{1}{4} \sum \text{dropout rate (years 2, 3, 4 and 5)}}{1.4}$$

With the condition that: $1 \leq \text{Dropout rate score} \leq 5$

As can be seen from the formulas, the indicators defined have been based on an average of the service figures quoted for 4 years (years 2, 3, 4 and 5) after licence award. The required information can be found in the specifications for the tender document, Table 9 Items 30 and 31.

3.3.8 Dimension: Frequency efficiency

Indicator: Frequency economy figures

The frequency economy which provides crucial evidence of the utilisation of frequencies as a common resource is relevant to include in the quantitative evaluation. The available frequency spectrum for the GSM operators is limited, and the GSM operator has to accommodate the active SIM cards within the limited spectrum.

The frequency economy will be assessed ultimo the 5th year after licence award, as this will provide information on the applicants' frequency economy in a mature network. The following indicator will be used to express the frequency economy:

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These values are added using the ownership ratios as weighting factors. The weighted sum is called the temporary score, which is renormalised to yield the final score.

The "experience points" depends on the number of occurrences within the GSM-roles defined in the box above.

Number of occurrences	Experience points given
1	2
2	3
More than 2	4

The word "occurrences" may need some further explanation in order to avoid that insignificant or redundant occurrences are counted. As a guideline, the applicant must play a major role. In addition, the network quoted must be in commercial operation in an OECD country. Finally, a number of similar participation in the same country may only be counted as one occurrence.

The final score is calculated according to the following formula:

$$\text{Final score} = \text{renormalisation factor} \times \text{temp. score}$$

The above-mentioned renormalisation factor is common for all applications and is chosen so that:

$$\text{Factor} \times \text{temp. score} = 5$$

for the application with the **highest** temporary score. This "renormalisation" of the score value will guarantee that the resulting final score will be between 5 and 1.

3.3.10 Dimension: Licence payment

Indicator: Up front licence fee payment

The amount the applicant is prepared to pay for the right to the licence is another factor in the evaluation, and one which can readily be included in the quantitative analysis.

The final score is calculated according to the following formula:

$$\text{Final score} = \text{renormalisation factor} \times \text{licence fee score}$$

The above-mentioned renormalisation factor is common for all applications and is chosen so that:

$$\text{Factor} \times \text{licence fee score} = 5$$

for the application with the **highest** licence fee score. This "renormalisation" of the score value will guarantee that the resulting final score will be between 5 and 1.

3.3.11 Dimension: Financial key figures

Indicators: Solvency and IRR

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There are a number of financial indicators, which all are interrelated. Two indicators have been chosen which both express the credibility of the business case: The solvency and the internal rate of return (IRR) as defined in the specifications. The solvency is a value which varies temporarily, and the average for the years 2,3,4 and 5 is used. The IRR is a value derived over the entire period of the business case (15 years), and it is not critical to consider the temporal variation here.

The scoring is based on the following tables:

Average solvency over year 2,3,4 and 5	
Solvency	Score
≥ 60%	5
≥ 45%	4
≥ 35%	3
≥ 20%	2
< 20%	1

Internal rate of return	
V=Numeric value of (IRR-11%)	Score
V < 1%	5
1% ≤ V ≤ 2%	4
2% < V ≤ 3%	3
3% < V ≤ 4%	2
V > 4%	1

The required information can be found in the specifications for the tender document. Table 15 Items 91 and 97. Should the applicant prepare a 5 year plan, the IRR score will be 1.

3.4 Vote casting and weight matrix

The following table shows how the votes will be given for each of the indicators in the quantitative evaluation:

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Indicator	A1	A2	A3	A4	A5	A6	Weight
Market penetration score 1							5
Market penetration score 2							5
Speed and extend of demographical coverage for class IV (2W) handheld terminals							7
Competitiveness of an OECD-like GSM2 basket							18
Number of international roaming agreements							6
Number of cells							10
Reserve capacity							10
Blocking rate							2.5
Dropout rate							2.5
Frequency economy figure							3
Number of network occurrences in the mobile field							10
Up front licence payment from the applicant							11
Solvency							5
IRR							5
Grand Total							100

Note: Credibility of business plan and the applicant's approach to market development will be covered by the following indicators: experience of the applicant, market development, solvency and IRR. Quality and viability of technical approach will be covered by the number of cells and the reserve capacity.

3.5 Procedure for the qualitative evaluation process

Despite the "hard" data of the quantitative evaluation, it is necessary to include the broader holistic view of the qualitative analysis. Other aspects such as risk and the effect on the Irish economy may also be included in the qualitative evaluation, which allow for a critical discussion of the realism behind the figures from the quantitative analysis.

The following describes some of the major steps in the qualitative evaluation process:

- 1) The eligible applications are read and analysed by the evaluators.
- 2) The eligible applications are evaluated by way of discussions and analyses.
- 3) When deemed adequate and necessary, in-depth supplementary analyses will be carried out.

*Appendix 3:
The evaluation model*

- 4) Initially, the marks will be given dimension by dimension. Afterwards, marks will be given aspect by aspect (subtotals) and finally to the entire applications (grand total).
- 5) When the dimensions are being assessed, the evaluators should, as far as possible, use the same indicators as used during the quantitative evaluation. Supplementary indicators may be defined, however, if the existing indicators are not sufficiently representative for the dimensions to be evaluated.
- 6) During the qualitative evaluation, the evaluators should take the results from the quantitative evaluation into account, as a starting point, and make the operationalisations of the dimensions (cf. indent 5 above) in order to make fair comparisons between the applications.
- 7) If major uncertainties arise (e.g. in accordance with step 4 of the quantitative evaluation or due to incomparable information) supplementary analyses might be carried out by Andersen Management International A/S in order to solve the matter.
- 8) The results of the qualitative evaluation will be contained in the main body of the draft evaluation report. The results of the supplementary analyses will be annexed to the draft report.

The draft report is to be presented and discussed among the 'essential persons' (identified by the Department). On this basis, Andersen Management will be asked to propose a final report.

3.6 Guide to the award of marks

In order to guide the markgiving, a matrix has been elaborated below. The dimensions and indicators are not weighted ex ante. The marks will be awarded according to a "soft" 5-point-scale (A, B, C, D, E) with A being the best mark. Averaging will be made after consensus among the evaluators.

Aspects and dimensions	A1	A2	A3	A4	A5	A6
Marketing aspects (subtotal)						
Market development						
Coverage						
Tariffs						
International roaming plan						
Technical aspects (subtotal)						
Radio network architecture						
Network capacity						
Performance guarantees						
Frequency efficiency						
Financial aspects (subtotal)						
Financial key figures						
Licence payment						
Management aspects (subtotal)						
Experience of the applicant						
Other aspects (subtotal)						
Risks (effects on the Irish economy)						
Grand total						

3.7 The interplay between the quantitative and the qualitative evaluation

Initially, the quantitative evaluation is conducted in order to score the applications. This initial score will be given during the first three weeks after 23 June. This initial score - together with number crunching performed on the basis of Excel spreadsheets - will then form the basis for the presentation meetings and the qualitative evaluation.

When the bulk of the qualitative evaluation has been performed, however, this evaluation will conversely form the basis for a recalculation of scoring applied initially if mistakes, wrong information or similar incidentals can be documented.

*Appendix 3:
The evaluation model*

The results of both the quantitative and the qualitative evaluation will be contained in the draft report with appendices to be prepared by the Andersen team.

4. Supplementary analysis on financial conformance checks and non-compliance

4.1 Introduction

In addition to the mandatory financial tables, some of the applicants describe their business plans in different tables. Unfortunately, there are examples of lack of conformance in the applications between the different financial statements.

One of the purposes of this supplementary analysis is to give a quick overview of the conformance between mandatory tables and voluntary financial figures from each applicant, see section 4.2 below, as the level of accounting accuracy demonstrated in the mandatory financial tables varies significantly among the applications, it has also been necessary to carry out supplementary assessments of non-compliances and inconsistencies in the financial plans in order to make the applications more comparable. An overview of the major changes made is outlined in section 4.3.

4.2 Conformance checks

The conformance checks have concentrated on some financial total figures where a comparison has been made between mandatory and voluntary tables.

The highlighted figures to be checked are:

- ⊕ Total turnover (item 36)
- ⊕ Total operating costs (item 51)
- ⊕ Net profit (item 59)
- ⊕ Accumulated profit (item 60)
- ⊕ Total investments (item 70)
- ⊕ Accumulated investments (item 71)
- ⊕ Net fixed assets (item 73)
- ⊕ Total assets (item 78)
- ⊕ Equity (item 81)
- ⊕ The relation between the profit & loss account and the equity
- ⊕ Operating and investment cash flow (item 104)
- ⊕ Net cash flow (item 110)
- ⊕ IRR (item 97)

Appendix 4:
Supplementary analysis on financial conformance checks and non-compliance

④ Solvency (item 91).

A comparison is not possible concerning all figures for all applications. For example, A4 has not stated a balance sheet in the voluntary tables, which leaves the evaluators with lack of comparability with other applications in relation to all figures that are taken from the balance sheets.

The conformance checks have resulted in the finding listed below.

A1:

The mandatory tables are used in the voluntary part, which provides some guarantees that conformance is in place.

A2:

In the voluntary cash flow summary (Financial book, 15 year Business Plan) an extra IR£ 20 million licence fee in year 1996 compared to the mandatory tables appears. This means that the voluntary balance sheet and equity is influenced by an extra IR£ 20 million. The consequence is that the solvency and IRR will not be the same in the mandatory and the voluntary parts.

A3:

General conformance has been noted.

A4:

Item 54 in the mandatory tables, profit before finance and tax, is miscalculated by adding the depreciation. This figure deviates from the voluntary projections in volume 5, Financial Plan, which are calculated correctly. The consequence of the miscalculation is that items 57, 59 and 60 are all wrong.

It seems like the equity is correct (there is no balance sheet in the voluntary part).

The solvency and IRR calculations are not influenced by the item 54-failure

A5:

General conformance has been noted.

A6:

General conformance has been noted.

4.3 Non-compliances in the financial plans

The level of accounting accuracy demonstrated in the financial plans varies significantly among the applications. In order to make all the applications comparable, a

*Appendix 4:
Supplementary analysis on financial conformance checks and non-compliance*

number of changes to the mandatory financial plan has been made. This section describes the changes made.

A1

A1 has made some errors in the original tables delivered with the application, where the 3% inflation correction was applied twice to some of the figures. This error was corrected by A1 on request of the Ministry with reference to paragraph 16 of the RFP document.

A1's cashflow statements include the financial costs in item 104, where it should not be included. Correcting this results in a slightly higher IRR.

In the mandatory tables, also the following shortcomings have been found:

- ⊗ item 71, accumulated investments, is not in conformance with the sum of item 70
- ⊗ item 72, accumulated depreciation, is not in conformance with the sum of item 53
- ⊗ unclear connection between the profit statement and the equity.

A2

A2 has a plan for dividend payments in a period, where the accumulated profit is negative. This is not allowed according to Irish law. There is derived effects on the figures used for the evaluation.

The dividend raised has been taken from the share capital, where it should have been taken from the reserves. There is no major derived effect of this.

There is a discrepancy between the tax stated in the P&L account and the tax stated in the balance sheet. This has been corrected with no derived effect on the figures used for the evaluation.

A3

In the accumulated cashflow (item 111) the dividend has been treated as an income, and interest payments have not been included. This leaves a discrepancy between the cash derived from the cashflow statement and the cash stated in the balance sheet, which has been corrected with no effect on the financial figures used in the evaluation.

A4

The dividends paid (item 109) are exactly equal to the net interest with opposite sign for all years, and there were a difference between the accumulated revenue and the reserve funds of exactly this amount. Therefore the dividend for the year has been reduced with the net interest. The error has been corrected and has an impact on some of the key financial figures.

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The debtors lines, items 101 and 75, have an opposite sign. This has not been adjusted in the cashflow statements, but could be adjusted in the balance sheet by adjusting the long term loan value. This change has not been done as the cause of the error was unclear.

A5

No corrections were made.

A6

No corrections were made.

The non-compliance investigations have caused no changes or corrections for A5 and A6, but minor changes for A1 and A3 and severe changes for A2 and A4.

4.4 Final remarks

The result of this supplementary analysis has shown that A2 as well as A4 present lack of conformance between the voluntary financial part of the business case and the mandatory financial tables and non-compliances between some of the items in the mandatory tables. A2 even proposes illegitimate dividend payments. In addition, non-compliances have been revealed in the applications of A1 and A3, whereas the applications of A5 and A6 are the only applications, where no financial mistakes or inconsistencies seem to occur.

The conformance check does not indicate major problems of conformance between the mandatory tables and voluntary financial figures, except for A2 and A4.

5. Supplementary analysis on blocking and drop-out rates

5.1 Introduction

The applicants for the second Irish GSM licence have in their applications described planning approach and network design assumptions upon which their respective solutions have been prepared. The qualitative evaluation of the applications aims at establishing a comparison of the solutions by looking into the expected "quality" of the suggested mobile telephone networks. An important quality issue in this respect is the so-called "Grade-of-Service" (GOS) or "Quality-of-Service" (QOS) which is typically related to the parameters specified as blocking and drop-out rates. Blocking rates refer to the probability with which a call attempt is blocked or rejected. Drop-out rates refer to the probability with which a call is terminated prematurely.

Originally intended to be combined into one of the evaluation-dimensions under the technical aspect in the qualitative evaluation, the blocking and drop-out rates were found to be calculated in an uncomparable manner from applicant to applicant. In order to maintain the principle of fairness and objectivity throughout the evaluation, it was decided to omit direct comparison of specified blocking and drop-out rates as one dimension among others in the planned evaluation. Instead, this supplementary analysis has been carried through to compensate for the apparent differences in the applicants' definitions and specifications.

5.2 Sources of information

The "Guidelines for submission of applications to become the second operator of GSM Mobile Telephony within Ireland", i.e. the mandatory tables, request calculation of busy hour blocking and drop-out rates on the radio path only. The figures submitted by the six applicants have been impossible to compare based on the "face values" quoted in the applications. In general, the applications state extremely favourable blocking and drop out rates.

The applicants have in general submitted average figures for blocking and drop-out rates which are considered non-representative for the suggested service where it is mostly needed, i.e. downtown Dublin. Consequently, all applicants were requested in writing to expand their description of expected blocking/drop-out rates by taking into account all factors resulting in an unsuccessful call(attempt) to and from PSTN under worst-case conditions. Particularly the following information was requested:

- ⊗ Worst-case blocking and drop-out rates on the applicant's own infrastructure.
- ⊗ Worst-case end-to-end blocking and drop-out rates. End-to-end is to be understood as the entire communication path on the applicant's own infrastructure and on the PSTN.

*Appendix 5:
Supplementary analysis on blocking and drop-out rates*

Taking into account the information given in the applications, the written answers to the questions given by letter, and the answers given during the presentation meetings, the following observations could be made concerning each of the 6 applicants:

A1

A1 has from Telecom Éireann acquired the information that the average blocking rate in the Irish PSTN is 2% in 1996, falling to 1% in year 2001 and onwards.

A1 has provided a written discussion of the applied calculation principles and presents in a table the worst case blocking rates during the period 1996 to 2010. Figures are stated for traffic in both directions and stay in the range between 3.2% and 4.2%.

A1 informs that Telecom Éireann cannot provide drop-out rate figures for the Irish PSTN. Experience shows that drop-out rates for A1's own network will more likely be 2% in year 1 and 1.75% from year 2 and onwards. By estimating an average 0.75% drop-out rate of the Irish PSTN, A1 finally states the total worst case drop out-rates to be 2.8 in year 1 and 2.5 for the rest of the period.

A2

A2 has not acquired blocking/drop-out rates for the Irish PSTN, but assumes a 1% blocking of this network (claimed to be a typical level in Europe).

A2 has in its application indicated very low figures for blocking and drop-out rates. Surprisingly in its written answers to the questions given by letter, following a short discussion of the applied calculation principles, A2 has indicated very high worst case blocking rates: 5.3% for city centres, 8.2% for urban areas and roads and 13% for rural areas.

However, the discussions during the presentation meeting revealed that (in spite of the guidance in the written question No 6) A2 had calculated the new blocking rates by also taking into account areas without coverage (consideration of a factor representing the probability of coverage). During the presentation meeting it was agreed that the resulting worst case blocking rate could be calculated by omitting the coverage probability factor. By applying this principle in the analysis, the evaluators find the relevant worst case blocking/drop-out rates to be constant 3.3% during the period 1996 to 2010 (no matter the coverage area type).

Concerning the worst case drop-out rate, A2 has indicated a figure of less than 1%. As this undoubtedly did not include drop-out in the PSTN, it was agreed during the presentation meeting, that A2's figure for worst case drop-out rate should be "less than 2%".

A3

A3 has, like A1, been in contact with Telecom Éireann concerning blocking rate figures of the PSTN. Based on own values and the information given by Telecom Éireann, A3 presents a table of worst case blocking rates during the period 1996 to 2010. The figures stay between 2% and 2.92%.

*Appendix 5:
Supplementary analysis on blocking and drop-out rates*

5.3 Final remarks

Based on the above findings, the results of this supplementary analysis can be summarised in the following tables. For convenience, the entries have been limited to the same years as applied in the quantitative evaluation.

Selected worst case end-to-end blocking rates:

(as retrieved from the applicants' information)

%	A1	A2	A3	A4	A5	A6
Year 2	4.0	3.3	2.92	2.27	4.0	3.0
Year 3	3.8	3.3	2.65	2.30	4.0	2.5
Year 4	3.6	3.3	2.54	2.28	4.0	2.5
Year 5	3.4	3.3	2.30	2.21	4.0	2.7

The values are in all cases below a 5% blocking rate with A4 displaying the lowest (best) result. This could in fact be true due to the excessive spare capacity offered by A4's network solution.

For the same reason it is remarkable that A5 displays the highest blocking rates, as A5, too, has provided a high spare network capacity (similar to A4's). It is obvious to conclude that A5's real life blocking rates will in fact be considerably lower and that the displayed figures represent an attitude of prudence (realism?) not always encountered in licence application competitions.

The most complete and comprehensive information on worst case end-to-end blocking rates appears to be provided by A1.

The drop-out rates are summarised as follows:

Selected worst case end-to-end drop-out rates:

(as retrieved from the applicants' information)

%	A1	A2	A3	A4	A5	A6
Year 2	2.5	< 2	1+PSTN	1+PSTN	< 2+PSTN	2
Year 3	2.5	< 2	1+PSTN	1+PSTN	< 2+PSTN	2
Year 4	2.5	< 2	1+PSTN	1+PSTN	< 2+PSTN	2
Year 5	2.5	< 2	1+PSTN	1+PSTN	< 2+PSTN	2

Further adjustment of the end-to-end drop-out rates cannot be justified due to the lack of definite information on Telecom Eireanns contribution, which furthermore depends heavily on the level of interconnection and the number of POIs.

The figures in the tables should speak for themselves and of course be studied in the light of the comments given to each of the applicants on the preceding pages.

*Appendix 5:
Supplementary analysis on blocking and drop-out rates*

In terms of comparing evaluation-dimensions and considering the relative uncertainty in deciding these figures, it could be added that the differences between the applicants are marginal from the offered network/service quality point of view.

The figures are furthermore heavily influenced by arbitrary assumptions, imponderables and optimistic versus pessimistic approaches. The evaluators have therefore decided not to take the blocking and drop out rates into consideration during the evaluation. In addition to the lack of comparable information, this is also justified by the fact that all the rates quoted would all result in the maximum score according to the pre-adopted evaluation method, see appendix 3. Thus, a scoring would not generate any viable discrimination among the applicants.

6. Supplementary analysis on tariffs

6.1 Background

A comparison of the applicants' offers regarding tariffs is a multidimensional task. To answer the question: "What are the costs for the user?" is not straight forward, as the answer depends on the chosen assumptions of call traffic pattern, total call minutes, metering and billing principles, price package, special offers, temporary discounts, etc.

The intention of this analysis is to enlighten the concept of tariffs through multiple investigations.

6.2 Conduct of analysis

Comparisons will be made within the dimensions of:

- ⊗ tariff packages
- ⊗ tariff baskets
- ⊗ projected price development
- ⊗ projected revenue per call minute
- ⊗ metering and billing principles
- ⊗ extra services
- ⊗ roaming abroad and international calls.

6.3 Findings

6.3.1 Tariff packages

All the applicants have at least two different packages. Each package consists of a connection fee, a monthly subscription and call charges per minute.

Appendix 6:
Supplementary analysis on tariffs

Connection fee

Connection fee IRE	A1	A2	A3	A4	A5	A6	A7
	30.00	21.25	15.00	31.00	40.00	35.54	50.00
		51.43	25.00			41.32	
						13.22	
						6.61	

A3 has the lowest connection fees (consumer's fee of IRE 15 and business user's fee of IRE 25) and in addition, A3 intends to let the fees be waived for the first 1 1/2 year during the roll-out period. A6 has for some special purpose packages lower fees than A3 (mobile to mobile within a predefined homezone and a "Friends package"). A5 has a universal connection fee for all packages which is the highest fee for the consumers, but no extra initial charges occur for A5's basic extra services, detailed bill, call forward, voice mail and short message. These extra services are charges by other applicants, cf. section 3.6.

Monthly subscription

Some of the applicants include in their monthly subscription fee free call minutes or a free call amount. (See tariff overview in appendix).

In general, the lowest subscription is planned by the applicants for light and off-peak usage. In that case, A4 with a monthly fee of IRE 8 and A5 with IRE 8.25 have the lowest fees. A3 has a package of IRE 10.33 including IRE 2.07 free calls which is close to the level of A5.

Call charges

The lowest call charges per minute are projected for off-peak hours. A1, A2, A3, A4 have as their lowest off-peak rate IRE 0.10 per minute. A6 has a special late night tariff of IRE 0.08. A5's off-peak rate is stated as IRE 0.125.

The lowest peak rates per minute are projected in connection with business user packages. A1 (IRE 0.12) and A5 (IRE 0.125) have the lowest peak rates. For A5 it is conditioned by a package including 300 call minutes per month.

Segment oriented packages and discounts

A1 has 3 packages: Personal Ring designed for consumers with security and convenience needs, Standard Ring for moderate call volume customers and Executive Ring designed for the heaviest business user segment.

In addition, A1 has a Fleet plan with savings on mobile to mobile within the defined fleet.

A2 has a Business User plan and a Low Frequency User plan.

A3 has a Business and an Individual package designed for different segments. In addition, A3 has a Team plan with a IRE 5 higher monthly subscription where 5 users can call each other at half rates, and a Home Town plan with cheaper rates for

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calls to a defined home town. For high volume customers, A3 projects a discount on the total bill.

A4 has a Personal plan designed for the occasional user, a Basic plan for the average user, a Premier Plan for the frequent business user, and a corporate plan with discounts for multi-users.

A5 has a Lite plan for the low volume off-peak segment, a Pro plan for the medium volume users and a Max plan for the high usage business customer. In addition, A5 intends to offer large corporate users a discount of 5-15% on the monthly bill, and to offer families the possibility of multiple subscriptions at discounted rates. The family package will contain extra SIM cards with selective call barring features for example allowing daughters and sons to call the home number at discounted tariffs. The package is supplemented by consolidated bills, sorted by sub-accounts. Furthermore, A5 intends to offer special tariff promotions, including low charges for mobile to mobile calls, free call minutes in limited periods, etc.

A6 has a Private plan designed for the low volume business users, a Friends plan designed for the high volume consumers, a Business plan for the high volume business users, and a Homezone plan with discounted mobile to mobile calls within a predefined zone. A6 intends to offer volume discounts on high call volumes.

6.3.2 Baskets

The applicants have calculated an OECD-like basket consisting of 1/3 initial fee, 1 year subscription and 1500 minutes of outgoing peak calls. A4 and A6 have not stated their cheapest price package, which is corrected here. A comparison of these baskets in year 4, excl. VAT, shows:

OECD-like basket	A1	A2	A3	A4	A5	A6	A7 current
IRE	466	462	391	436	486	293	632

The cheapest basket is from A6. Second cheapest is A3. A5 has the most expensive basket.

In order to evaluate the influence of the total annual call minutes on the user's costs two graphs have been drawn based on the assumptions of a consumer and a business user profile. The consumer profile is defined by the content of 1/3 of the connection fee, 1 year of subscription and 20% outgoing peak calls and 80% outgoing off-peak calls. The business user profile is defined by the content of 1/3 of connection fee, 1 year of subscription and 80% outgoing peak calls and 20% outgoing off-peak calls. Prices are excl. VAT from year 1 and the optimal price package is chosen throughout the range of annual call minutes.

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Supplementary analysis on tariffs

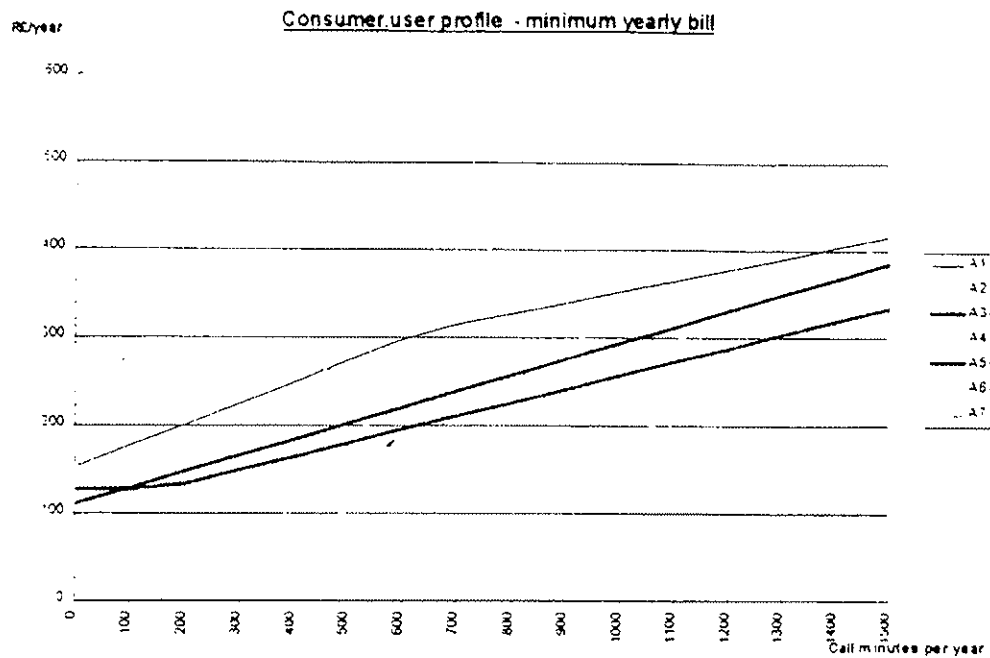


Figure 1. Consumer user profile

The consumer profile graph with the relevant annual call minutes in the range up to 1200 shows that A1 and A2 have the most expensive baskets. A6 has the cheapest basket except for very low call minutes per year. A3, A4 and A5 are medium priced, A3 being the cheaper of the three.

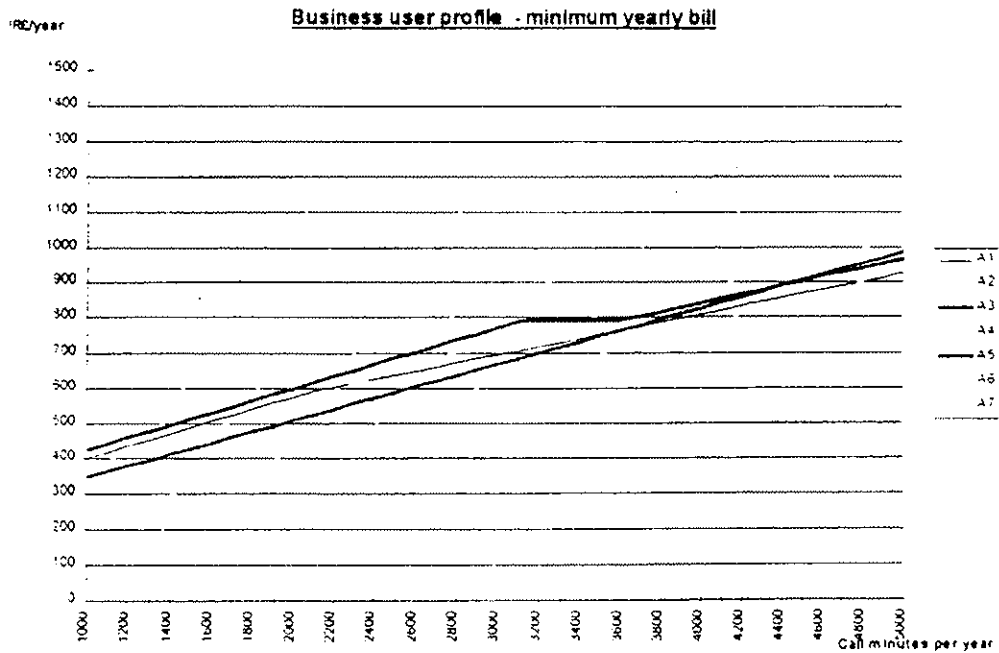


Figure 2. Business user profile

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The business user profile graph with the relevant range of annual call minutes from 1500 to 3000 shows that A6 has the cheapest basket and A2 the most expensive basket. A3, A4 and A5 are medium priced, A3 being the cheaper of the three.

6.3.3 Price development

The applicants have stated their OECD-like baskets over the 14 year plan period. The development in these baskets can be taken as an indicator of their projected tariff price development.

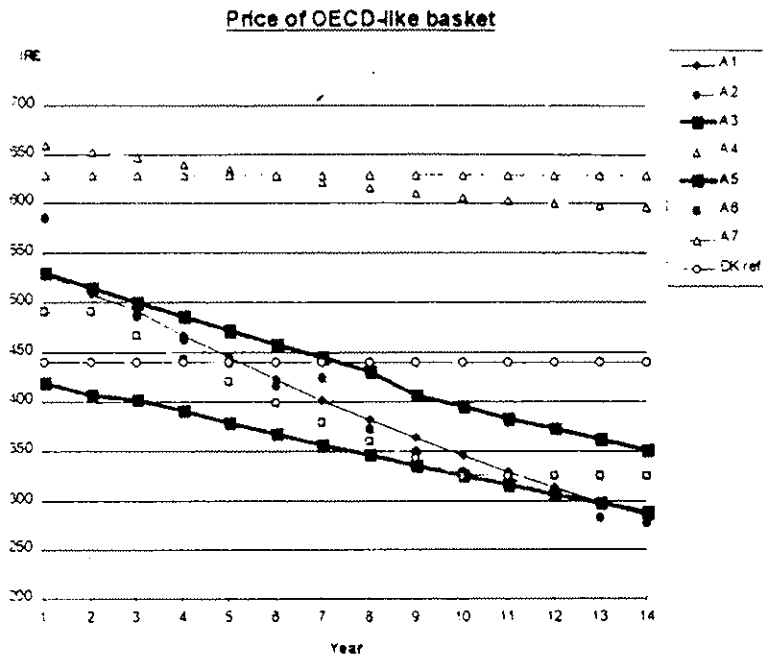


Figure 3: OECD-like basket (DK ref is a calculation of an OECD-like basket calculation in Denmark at present)

The graphs show that the gap between A3 and the other applicants will diminish over the years. (These graphs are the applicants' stated figures without corrections, and therefore, figures in section 4.1.3 of the main report (figure 11) regarding A4 and A6 may diverge).

6.3.4 Usage revenue per call minute

In its nature, all the above-mentioned comparisons are tariff scheme comparisons. A comparison of the effective costs for the users may be to compare the applicants' projected usage revenue per billable call minute as shown in the following graph:

Appendix 6:
Supplementary analysis on tariffs

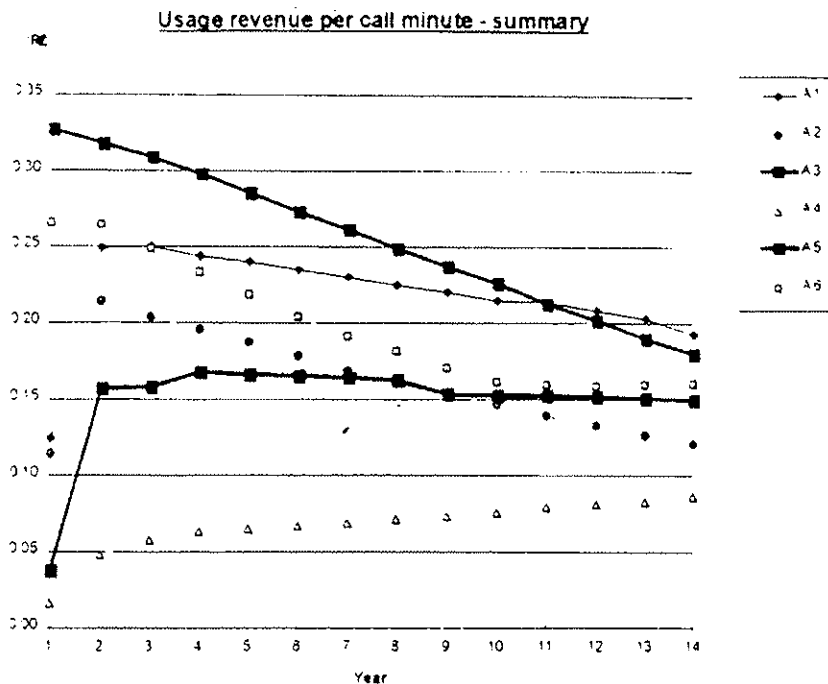


Figure 4. Usage revenue per call minute

Unfortunately, these figures are distorted by the fact that some of the applicants have projected tariff packages with free minutes or call amount included in the subscription fee, thereby transferring usage revenues to subscription revenues. In addition, different assumptions of traffic and contribution of traffic on peak and off-peak hours and revenues from different distribution channel levels may cause distortions. However, these figures also reflect the projected true billing to the users, considering the actual metering and billing principles (see below about unitisation).

A4 has very low revenue per minute projections. A5 has the second lowest projections. A3 has the highest revenue projections. Despite all reservations due to the above-mentioned possible distortions of the figures, a comparison of the projected true billing revenues indicates a need for modification of the evaluation based solely on tariff scheme comparisons.

6.3.5 Metering and billing principles

All the applicants state call connection or B-answer as the trigger-event for recording call time units. A1 and A6 are billing in seconds, while the other applicants assume billing in units of 10 seconds. No applicant recommends the use of call set-up charge. A2, A3, A4 and A5 charge a minimum of 30 seconds per call. A5 has expressed an intention of per second billing, leaving out the 10 second units and the initial 30 seconds. Depending on the traffic structure, this change in metering and billing principles has a significant effect on users' cost and may cause a difference of approx. 10% in the actual price per effective call minute. The biggest impact is on short duration calls, which is illustrated by the following calculatory examples:

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Supplementary analysis on tariffs

Duration of call	Extra charged
10 sec.	200%
21 sec.	43%
31 sec.	29%
61 sec.	15%
91 sec.	10%
121 sec.	7%
181 sec.	5%

It should be born in mind that mobile calls are short duration calls with an average duration of close to 2 minutes.

A3, A5 and A6 have a daily peak hour period of 10 hours Monday to Friday. A4 has a daily peak hour period of 12 hours, which is a 20% longer period to the highest tariffs. A2 has a 12 hour peak period for business users and 10 hours peak period for low frequency users. A1 has 11 1/2 hour peak period for business users and 9 hour peak period for low frequency users.

Depending on the traffic distribution, an extended peak definition has a noticeable influence on the user's costs.

6.3.6 Extra services

The applicants offer several additional services to mobile voice telephony. Some of these services are charged and others are free. For comparison an overview of the basic extra services is shown:

Service	A1	A2	A3	A4	A5	A6
Detailed bill	free	n.a.	1£/bill	free Personal: charged	free	charged
Call forward	charged	n.a.	n.a.	free Personal: charged	free	n.a.
Voice mail	free	n.a.	free	free Personal: charged	free	charged Business: free
Short message	initial fee charged	n.a.	5p/mess.	n.a.	7p/mess.	n.a.

6.3.7 Roaming abroad and international calls

All the applicants except A2 project a surcharge of 15% to the host country's bill for GSM2 subscribers roaming abroad. A2 projects a fixed amount as a surcharge for roaming abroad. This amount is IR£ .62 in year 1, which for most cases significantly will exceed by 15%.

Tariffing for international GSM2 calls from Ireland is illustrated by the following examples of peak and off-peak rates:

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Supplementary analysis on tariffs

Destination	A1	A2	A3	A4	A5	A6	Telecom Eireann
Northern Ireland	Telecom rates + airtime	61/.46	25/.17	Telecom rates + airtime	Telecom rates	Telecom rates + airtime	.23/.15
U.K.	do.	61/.46	36/.30	do.	do.	do.	27/.21
Near Europe	do.	.89	37/.35	do.	do.	do.	36/.32
U.S.A.	do.	2.47	69/.63	do.	do.	do.	55/.50

Among the applicants, A5 has the cheapest international call rates.

6.4 Conclusion

The concept of tariffing is multidimensional and no application is best on all dimensions. In the comparisons mentioned before, A6 has the lowest tariffs, except for international calls. In addition, A6 has consumer attractive metering and billing principles, but A6 charges for basic extra services.

A comparison between A3 and A5 shows that A3 has the lowest tariff schemes for domestic calls. A5 has the lowest tariff scheme for international calls and projects the most consumer attractive metering and billing principles as well as volume-related discounts of 5-15%. Furthermore, A5 projects the lowest revenues per minute and free detailed billing and call divert. Taking these mitigating factors into account, A5 is left just a fraction behind A3 in the overall tariff comparisons.

7. Supplementary analysis on interconnection

7.1 Introduction

Interconnect costs for connecting calls from the GSM2 net to the PSTN net and interconnect revenues from receiving calls from the PSTN net are substantial parts of the applicants' business plans. In order to conduct an even comparison of the applicants' business plans, these should be based upon common assumptions. This is not the case concerning the interconnect assumptions.

The purpose of this supplementary analysis is to give an overview of the financial effects of differences in the applicants' assumptions.

7.2 Conduct of the analysis

The analysis has concentrated on the key figure IRR as an overall financial key figure of the business plan.

The applicants' quoted item 37, interconnect costs with the PSTN, and the quoted item 34, interconnection revenues have been recalculated.

The recalculation is based upon each applicant's own information on percentages of outgoing and incoming calls and billable minutes. The calculated call minutes are multiplied by common charges for a 10-year period. These charges are IR£ 0.088 per minute for incoming calls to the GSM2 net and IR£ 0.059 per minute for outgoing calls to the PSTN. The outgoing interconnect charge, mobile to land, is based on an assumption of 60% local interconnect and 40% trunk interconnect. As a simplified assumption, mobile to mobile interconnection is not taken into consideration.

*Appendix 7:
Supplementary analysis on interconnection*

7.3 Findings

The assumptions made by the applicants:

Applicant	Outgoing interconnect costs per minute (IR£)	Incoming interconnect revenues per minute (IR£)
A1	In year 1: .043 falling to .017 during the 10 year period	In year 1: .088 Constant during the 10 year period
A2	.05 constant throughout the period	n.a.
A3	.043 local and .083 national constant throughout the period	n.a.
A4	.043 local and .083 national constant throughout the period	n.a. Assumes that the total interconnect revenues are equal to the total interconnect costs
A5	.043 local and .083 national decreases with 2% p.a. during the period	In year 1: .088 increases to .147 in year 2
A6	.043 local and .083 national decreases with 5% p.a. during the period.	.088 decreases 5% p.a.

The recalculation of the IRR per applicant using common assumptions presents the following:

%	A1	A2	A3	A4	A5	A6
IRR on applicant's own assumption	17.2	10.6	17.1	10.6	12.2	5.7
IRR recalculated on common assumptions	12.5	10.5	17.6	4.7	10.6	7.1

7.4 Conclusion

The recalculation shows the significant effect on IRR of the assumptions chosen by the applicants. If using the common standard set of assumptions mentioned before, the IRRs of A1 and A4 will decrease significantly. For A1, it is a consequence of its assumption of a heavy decrease in interconnect costs per minute. A4's IRR changes to a critical low level as a consequence of its original unrealistic assumptions of balancing interconnect revenues and interconnect costs. The IRRs of A5 and A6 have changed in a minor degree, and the IRR's of A2 and A3 are almost unchanged.

The distance between A3 and A5 remains, however, at the same level, and the recalculations have not changed the award of marks to these applications. Changes in the award of marks would only provide A1 with a slightly better marking and A4 with a worse marking. Thus, the evaluators have arrived at the conclusion that this will only confirm the general ranking of the applications.

The evaluators have also arrived at the conclusion to lessen the importance of the recalculations based on uniform assumptions and to take notice of the different assumptions and degree of conservatism.

8. Supplementary analysis on the effects on the Irish economy

8.1 Introduction

The direct and indirect effects of the GSM2 operation on the Irish Economy is described to various depths in the applications. Some applicants, e.g. A3, describe various types of effects on the Irish economy, while other applicants only describe the direct effect related to the deployment of a GSM network.

No common methodology has been used to describe these effects, and in order to compare the different applications, some common analysis methods must be applied. These are explained in section 2, whereas the result of the analysis is described in section 3.

8.2 Common methodology

The information provided (or not provided) in the application is evaluated according to an "acceptance matrix", which indicates which parts of the information will be used in evaluating the effects on the Irish business:

	Mentioned in the application	Not mentioned in the application
Will be used when evaluating the effects on the Irish economy	2) The indirect effects will be considered as a function of the economic size of the applicant only. Commitments about funds for the support of the public interest.	4) The indirect effects on the businesses dependent on the telecommunications market must be addressed separately.
Will be disregarded	1) Effects which are gained through non-EU compliant methods. 3) New non-GSM business generated by the consortia members as "a consequence" of the GSM business. Information about the location of headquarters. The inflow of equity capital from local and foreign consortia members. The "export" of dividend.	N/A

Table 1: The acceptance matrix

ad 1: Many applicants state that they will stimulate Irish business by seeking services from the local Irish manufacturers or subcontractors. Such a procurement practice is not in accordance with the EU procurement rules, and a company which tries to follow such buy-Irish practice may run the risk of legal action by the Commission.

ad 2: The stated size of the indirect effects of the GSM2 business depends on the "multiplication factor". This factor is applied on the number of employees in the GSM2 consortium to get the number of employees in indirect businesses. The

*Appendix 8:
Supplementary analysis on the effects on the Irish economy*

variation of the multiplication factor cannot be seen as a consequence of substantial differences between the application but is regarded as random differences due to different economic models. In order to judge the indirect effect of the GSM2 business, we have chosen a model which is based on the accumulated turnover of the operator. It is assumed that a certain ratio, namely 25%, of this turnover will be fed back into jobs. The percentage will depend on many factors such as the shareholders' usage of the dividend, the reinvestment strategy of the consortium, the margin, etc., many of which are outside of the Minister's control. The choice of 25% is a qualified guess, the important issue is that the same factor is used for the comparison of the applications.

ad 3: As an example A2 mentions that as a consequence of Comsat's presence in Ireland, the television telephone shopping organisation, QVC, will create 2,600 jobs in Ireland. It is not possible to judge the numbers, but the linkage to the GSM project is not clear. The GSM business must be driven as a profitable business, and as a regulatory special rights area it must have a financial arms length to competition area businesses with no cross subsidies to QVC. QVC may as well create the given number of jobs even if A2 does not win the licence - provided the business, which would create these jobs, is sound and profitable.

ad 4: Certain types of business are highly sensitive on the prices of the telecommunications services. As an example, Brian Cogan from Forfas estimates that a strong reduction of the international tariffs would pave the way for the establishment of a large scale Irish call centre service employing 40,000 people. The availability of new telecommunications services such as international ACD (Automatic Call Distribution) queuing will also stimulate the Irish call centre market. These kinds of services are likely to be developed in a competitive telecommunications market. This example shows that price and service competition generates new business and new jobs in Ireland - and to an extent largely exceeds the more direct effects. The effect, though, can neither be quantitatively linked to the "competitiveness of the applicant" nor to other similar qualitative dimensions.

8.3 Analysis of the effects on the Irish economy

8.3.1 Indirect jobs created

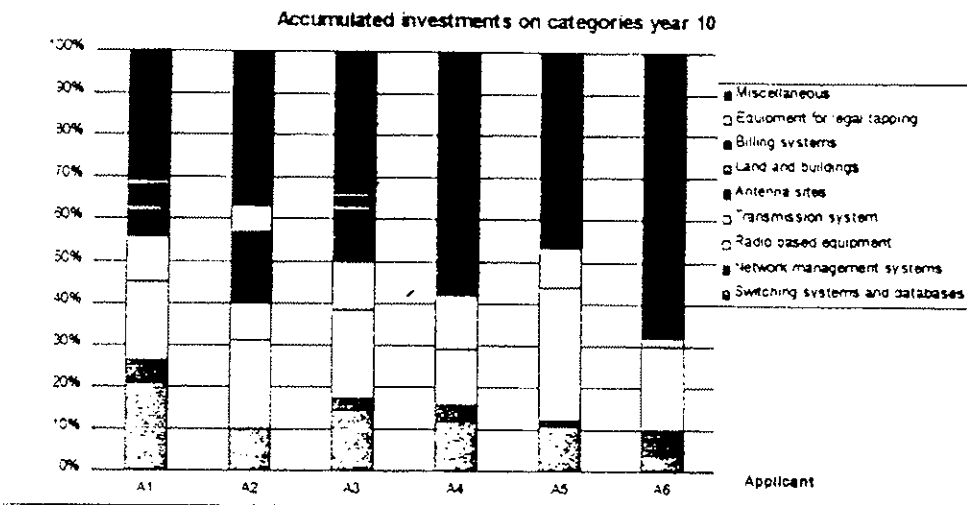
As stated in section 2, we have chosen to judge the jobs created by the indirect effects of the GSM2 operator from the financial figures given. In order to make the applications comparable, we include three effects:

- ① The effect of the activity generated by the infrastructure suppliers in Ireland
- ② The effect of direct employment in the GSM2 company calculated on the basis of the operating expenses
- ③ The effect of the reinvested profit calculated on the basis of the turnover.

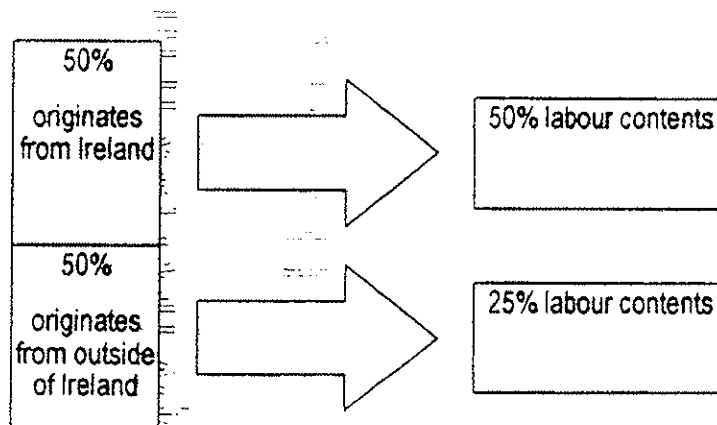
Appendix 8:
Supplementary analysis on the effects on the Irish economy

8.3.1.1 Effect of the investments

When judging the effects of the investment, the ratio between locally manufactured and imported goods must be taken into account. The distribution of the investments on the types of equipment listed in the tender material is shown in the figure below:



The figures show that approximately 50% of the investments are “high tech” transmission and radio equipment, generally not manufactured in Ireland. The assumptions used for the assessment of the effects in terms of jobs are shown in the figure below:



The weighted average is 33% labour contents of the investment. Using this figure on the planned investments over the first 10 years will result in the following:

	A1	A2	A3	A4	A5	A6
Accumulated investments ('000) year 1 to 10	50,755	53,803	47,588	44,051	57,820	42,154
Estimated average labour contents	33%	33%	33%	33%	33%	33%
Average annual salary incl. overheads	40,000	40,000	40,000	40,000	40,000	40,000
Estimated manyears indirectly created	419	444	393	363	477	348
Estimated average number of ,000s	42	44	39	36	48	35

Appendix 8:
Supplementary analysis on the effects on the Irish economy

8.3.2.1 Effect of the operating expenses

Using an annual salary of IR£ 40,000 including overheads, we assess that 100% of the operating expenses not related to Telecom Eireann² is turned into labour:

	A1	A2	A3	A4	A5	A6
Accumulated selected op. exp. (1000) year 1 to 10	298,360	234,276	265,763	353,239	420,502	325,745
Estimated average labour contents	100%	100%	100%	100%	100%	100%
Average annual salary incl. overheads	40,000	40,000	40,000	40,000	40,000	40,000
Estimated manyears indirectly created	7,459	5,857	6,644	8,831	10,513	8,144
Estimated average number of jobs	746	586	664	883	1,051	814

8.3.2.2 Effect of the reinvested profit

It is estimated that 25% of the turnover over the first 10 years will be funnelled back to the society by the investors or by the operator in terms of indirect businesses. Using the figures given in the applications, the average number of jobs created over the first 10 years period varies from approx. 400 to approx. 570:

	A1	A2	A3	A4	A5	A6
Accumulated turnover (1000) year 1 to 10	748,208	504,623	633,245	908,535	780,567	556,624
Estimated return into new jobs	25%	25%	25%	25%	25%	25%
Average annual salary incl. overheads	40,000	40,000	40,000	40,000	40,000	40,000
Estimated manyears indirectly created	4,676	3,154	3,958	5,678	4,879	3,479
Estimated average number of jobs	468	315	396	568	488	348

Table 2: Calculation of estimated number of indirect jobs created

A4 stands out with the highest turnover and consequently the highest number of indirect jobs. It should be noted, however, that the average usage figures in A4's business plan is between 80 and 100 percent higher than the average of the usage figures quoted by the other applicants for further discussion, cf. the main report, chapter 4. If the usage figures are adjusted to the average figures, the 10 year turnover will decrease from 908,535 to 667,472 resulting in an estimated indirect job creation average of 417.

8.3.2.3 Total effect

Making the three effects, the total effect is calculated:

	A1	A2	A3	A4	A5	A6
Estimated number of jobs investments	42	44	39	36	48	35
Estimated number of jobs based on operational expenses	746	586	664	883	1,051	814
Estimated number of jobs based on reinvestments	468	315	396	568	488	348
Estimated average number of jobs	1,255	945	1,099	1,487	1,587	1,197

² The following highlighted items from the operating expenses are included: Interconnect with the PSTN; Leased lines and links; Own transmission links; Antenna sites; Other network elements; Administration costs; Office facilities; Bonus to distribution channels; Marketing costs; Personnel costs; Social security costs; Licence, administration and frequency fees; R&D costs; Other costs.

*Appendix 8:
Supplementary analysis on the effects on the Irish economy*

8.3.3 Commitments

Among the 6 applicants, A1 and A5 promise that they will stimulate certain areas by various means:

A1	A5
Will devote IR£ 1 million a year to research on "an ongoing basis" Will fund a university chair of a "leading Irish engineering institution" Sponsor projects at post-graduate and under-graduate levels Will offer a cellular design course	Will grant 2% of the revenue to research (approx. IR£ 5 million in year 15) Will effectuate an annual audit on the employment and revenue flow generated by the GSM2 business

Table 3: Commitments made by A1 and A5

The promises stated in the applications cannot be included in the licence application as they must be regarded as a "fringe benefit" to the essential telecommunications business.

8.3.4 The effects on the macroeconomic level

As stated earlier, it is the view that the effects on the Irish economy at the macroeconomic level is proportional to the competitiveness of the telecommunications market. The following table gives our estimate of the competitiveness of the telecommunications market for the period of 1996 to 2000 (the year of the more wide telecommunications liberalisation in Ireland):

Second GSM operator	Level of competitiveness	Comments
A1	Medium	The main base of knowledge is from the old monopoly based companies.
A2	Medium	An aggressive market approach is expected from a company with high American dominance.
A3	Medium	A3 has done some market research and with the commitment to place the tariff package among the lowest in Europe, the elements for a competitive market might be in place. However, the existing links from some of the consortium members to Telecom Éireann might in practice turn out to be a constraining factor.
A4	Medium	With AT&T's unrealistic high traffic expectations, and the lack of market research done in Ireland, the consortium's effect on the telecommunications competitiveness cannot be determined.
A5	High	Bearing in mind the existing competitiveness of ESAT, the likelihood of a cosy duopoly is small. The psychological effect of granting a licence to a family member of an existing competitor to Telecom Éireann is expected to stimulate the incumbent.
A6	High	Cellular prices will be pressed in downward direction by the very aggressive tariff policy of A6.

9. Supplementary analysis on consortia composition and selected risks

9.1 Introduction

This supplementary analysis contains information on the composition of the consortia as described in the applications concerning management aspects such as

- ⊕ shareholding by Irish partners and the public
- ⊕ plans or intentions of share flotation
- ⊕ shares held by State-owned or semi-state owned bodies
- ⊕ interests/partnership relating to Telecom Éireann
- ⊕ interest relations between partners in a consortium.

A considerable part of the information provided in this appendix also appears in chapter 3 of the main report.

9.2 The consortia composition

A1	Irish MobiCall
25 %	SBC Communications Inc. (Southwestern Bell Corp.)
25 %	DETECON (30% Deutsche Telekom, 3 banks)
25 %	Tele Danmark International (Telecom A/S)
25 %	3 Irish investors:
	10.5% Martin Naughton
	10.5% Lochann Quinn
	(The two together own all shares in Glen Dimplex)
	4% Kieran Corrigan.

The application states an intention to enlarge the ownership base by flotation of 25% of the share holdings held by MobiCall's members. This will be initiated after 3 years of operation, depending on the success of the company and on stock market conditions.

The initial shareholding by Irish investors will be of 25%. After flotation, as mentioned above, this amount could rise to nearly 45%.

Appendix 9:
Supplementary analysis on consortia composition and selected risks

A2 Cellstar

60-64% Comcast Corporation US

36-40% 3 Irish investors:

15% Radio Telefis Éireann (100% State owned)

6-10% Bord na Móna (100% State owned)

15% GCI Limited (newly formed Irish company)

The application states a willingness, if desired by the government, to offer to the public at some time in the future (after 3-5 years) up to 30% of the equity in the form of ordinary shares.

The initial shareholding by Irish investors will be of 36-40%, which after a flotation could rise to about 55%.

Tele-Communications, Inc., (TCI), who indirectly owns a 12% share in consortium A4 (through Prince Holdings Ltd), has entered into partnership with Comcast Corporation et al. on US PCN networks.

A3 Persona

26.7% Motorola

26.7% Unisource (NL, S, CH, E telecom joint venture)

26.7% Sigma Wireless (Irish mobile communications group)

20% ESB (100% State owned)

The initial shareholding by Irish investors will be of 46.7%. The application includes no intention of share flotation.

Sigma Wireless was formed in 1991, following a management buy-out of Motorola's Irish distribution activities. The principal activities of the company are the exclusive distribution and sale of Motorola radio communications products and systems in Ireland.

Motorola is a 49% shareholder in a joint venture with Telecom Éireann, called Eirpage, which provides the only nation-wide paging service in Ireland.

A4 Irish Cellular Telephones

26%	AT&T		26%
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48%	Princes Holdings Ltd		
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16.4%	United and Philips Comm.	9.6%	26%
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2.0%	Independent Newspapers	24%	26%
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2.6%	Riordan Communications	2.4%	5%
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	Tele-Communications Inc.	12%	12%
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*Appendix 9:
Supplementary analysis on consortia composition and selected risks*

5% semi-state owned body 5%

The semi-state owned body is Shannon Development (Shannon Free Airport Development Company Limited), a company established by the Government of Ireland.

The last column represents the distribution of total interests after allocation of the share holdings of PHL among its partners. From this, the initial Irish share of interests in ICT will be 36%. ICT proposes to make a public offering of approximately 25% of its shares within 3 years of the award of the licence.

A5 Esat Digifone

50% Telenor Invest AS

50% Communicorp Group (34% held by Advent Int. plc)

The initial shareholding by Irish investors will be of 33%. It is the intention of the applicants to make 20% of the equity available to institutional investors in the period prior to service launch, including a 5% equity stake to Advent International (US). Within three years of launch, it is the intention to make a further 12% of the total equity available for flotation.

A6 Eurofone

40% MIC (Millicom International Cellular)

20% Kinnevik (39% shareholder in MIC)

40% Independent Trust:

10% option to Coras Iompair Éireann (CIE) (semi-state)

30% public share issue after receipt of licence

The initial shareholding by Irish investors would thus be approx. 40%, with the intention of the applicants to increase this to 50% within 4 years from the award of the licence.

9.3 Final remarks

It should be noted that many relationships exist between a number of the partners participating in the competing applications. It seems to be normal procedure that a telecom company can cooperate with another telecom company in one area of business, and at the same time compete vigorously with the same company in another area of business. Only a few relationships are mentioned here.

Following relationships and other points of interest should be noted:

- ⊗ Consortium A3 Persona: Motorola has a 26.7% stake in the consortium and close business relations to Sigma Wireless (26.7% shares).