Co-funded Contracts: The New Approach in Support of European Space Competitiveness

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The Resolution on the Agency's Industrial Policy adopted by the ESA Council at Ministerial Level in Paris in 1997 marked a clear step towards action to improve the competitiveness of European Industry in the worldwide space market. In particular, Ministers decided that the technologies developed within the Agency's programmes should be used more extensively to stimulate Europe's industrial competitiveness in commercial markets. A transitional period of three years (1997-1999) was established in which to define specific measures to achieve these objectives and to test them. This article is based on the experience of the authors in the processing of more than 100 industrial proposals in the framework of the ESA Technology Research Programme (TRP).

The co-funding approach in technology procurement

The fundamental principle of the new procurement approach described here is to support the development of those technologies/products needed to improve European Industry's competitiveness. In practice, while ESA still defines the strategic areas to which public investments should be directed, Industry is widening its traditional role by taking the lead in the product definition, specification and implementation aspects. This represents a major change in the traditional customer/contractor relationship between ESA and Industry and, as a consequence, they now share the financial burden of the project development effort (so-called 'co-funding').

The implementation of such a novel approach requires changes in several elements of the procurement process, namely the Invitation to Tender (ITT), the evaluation process, and the inclusion of a business plan, and there are also the contractual issues.

Table 1

Fully ESA-funded approach	Co-funded approach
Agency's full financial coverage	50% maximum Agency contribution to the total contract price
Agency's technical requirements	Industry's technical requirements (justified by commercial interest)
Agency's detailed definition of the Statement of Work (SOM) and programme of work	Agency's Top-Level Statement of Work (SOW). Programme of work defined by Industry
Standard ESA contract conditions	Contract conditions tailored to guarantee Industry's Intellectual Property Rights (IPR)

The Invitation to Tender

In order to ensure a proper selection process, a modified ITT approach has been developed. A quick comparison between the traditional ITT and the co-funded one is provided in Table 1.

In addition, in a co-funded ITT there is a need to obtain access to information on the commercial potential of the technology/product to be developed by Industry in order to assess the commercial credibility of the industrial proposal. A 'Business Plan' is therefore requested as an essential element of the offer. Consequently, in the evaluation process there is specific action and criteria to assess the quality and credibility of that Business Plan.

The need to protect sensitive commercial information contained in the Business Plan has led to the implementation of a stricter confidentiality procedure within ESA (i.e. secure document warehousing, restricted document access controlled by security guards, etc.). In particular, the Business Plan is requested to be delivered in one copy only, and it is kept at ESA's premises only for the time needed to conduct the proposal evaluation. It is returned to the bidder immediately the evaluation

process is completed. In the case of contract award, the contractor selected is obliged to keep the Business Plan, duly countersigned by ESA, at its premises and at the disposal of ESA Contracts representatives.

The Business Plan

A major novelty brought by the new co-funded approach is the introduction of the Business Plan into the evaluation process. Companies who want to develop or improve their products for the market place must have an in-depth knowledge of that market. They must assess their ability to tap part of that market successfully at the right time, with the right product offering. Data and ideas have to be collected and organised in a structured manner, ways of acquiring the necessary funding for the project have to be found, and marketing and sales actions have to be planned. All of this should be found in a good Business Plan.

The Business Plan is a tool that the Company utilises as a blueprint in order to progress from the project idea to a successful (in a commercial sense) product or service. The companies themselves are not the only users of the Plan. Where there is a need to access external financial resources, the Business Plan is a pre-requisite for the venture. A thorough analysis of the Business Plan can provide potential investors with the necessary confidence that the venture has a good chance of being profitable and therefore represents a good investment opportunity. There are many different forms of Business Plan that go through different levels of the business process giving details depending on the project time horizon, the level of competition, and the specific industry.

The Agency is already dealing with Business Plans in the framework of the ARTES telecommunications programme, where the Business Plan is an integral part of the overall proposal-evaluation process. In the Technology Research Programme (TRP), where the project time-scales are usually longer, the emphasis is more on the strategic, longer-term prospects for the proposed product/technology; as a consequence, the estimates and evaluations to be found in the Business Plan cannot be quantitatively very precise. Qualitative considerations and trends become more important in such cases.

The main elements of a TRP Business Plan requested in a co-funded Invitation to Tender are:

- The Technical Description of the Product/Service
- The Market Analysis
- The Competitive Analysis
  - Competitors and their Products
  - Strengths, Weaknesses, Opportunities, Threats (SWOT) Analysis
- The Company's Marketing Strategy
- The Financial Planning and Risk Analysis.

The main concepts and most commonly used terminology in these elements, which we ourselves used in the industrial proposal evaluation process, are discussed here to give an idea of the rationale for the information that one can expect to see in a sound Business Plan. We will not distinguish between products and goods or services, which we will simply term the 'product', and we will refer to the company that originates the Business Plan as 'the Company'.

Description of the product

This part of the proposal presents the characteristics of the proposed product in detail. It must be noted that this description is substantially different from the one given in the technical proposal. While the latter provides a detailed description of the technical features of the proposed product, here the Company talks about user benefits and services. It describes how the product's technical features translate into user benefits. For example, a producer of electric engines would describe the technical characteristics (efficiency thrust, impulse, dimensions, etc.) in the technical proposal; in the Business Plan, he will describe the possible applications of that engine: where it could be fitted on board standard platforms, provide sufficient thrust to avoid use of other engines, and/or save propellant mass, etc.

In the same way, a producer of disposable contact lenses will describe in the technical proposal, the production process, the clarity, and the resistance to folding of a new contact lens. In the Business Plan he will rather describe its improved compatibility with the human eye, its greater durability, and the easier cleaning process for the user.

Market analysis

The second step in the synthesis of the Business Plan is the so-called 'Market Analysis'. There are a number of ways of conducting this exercise. Market analysis can be performed through interviews with potential customers (primary data), utilising previous market analysis for similar products and or markets, utilising macro-economic indicators such as Gross Domestic Product (GDP), spending power, etc. (secondary data). The effectiveness of each methodology depends on the specific case.

All of these methods have a common objective: 'to estimate the size of the (potential) need for the product', which means making an evaluation on how many people are willing to pay to satisfy such need and therefore to buy the product. At this level, we do not yet talk about pricing, but assume that the product will be fairly priced. The extent of the market analysis very much depends upon the specific product, the actual status of the market's development, and the competitive scenario. If, for instance, we are in the market-introduction phase for a product that is relatively new, the market-analysis effort will concentrate on interviews and focus groups. If instead the market is a mature one (similar products have already been introduced and we are now at the second or third product generation, customers know the product, its competition and prices), the market analysis can be done through deskwork: data mining, database consultation, etc.

It must be stressed that, as for many other elements of the Business Plan, it is very important for the evaluator to have a good knowledge of the market. The output of this activity is a quantitative evaluation of the so-called 'Available Market'.

Competitive analysis
This section of the Business Plan deals with the analysis of other companies that offer, or are about to offer, the same or a similar product. In particular, it evaluates which portion of the 'Available Market' they serve (market share). Also here, depending on the state of evolution of the specific market, we see different scenarios that require different analysis tools. In a mature market, the competition scenario is rather stable and well-known; established-competitor performances are also known. The analysis is then much easier than in a new, undeveloped market where it is not clear how many competitors will appear, what the market dynamics will be, and how the buyers will behave, etc. (e.g. Iridium's mobile system).

The marketing strategy of the Company is very important. It makes a big difference whether the Company is trying to enter a (new) market, or whether it wants to increase its market penetration, or whether it merely wants to defend its existing market share against a new entrant.

The market share of each competitor is not the only important element of the competitive analysis. To get a complete picture of the competitiveness scenario, it is necessary to perform a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis. This is a systematic and powerful tool for assessing the major strengths and weaknesses of each competitor. Examples are intellectual property rights (Strength), low market-entry barriers (Threat), access to unlimited resources (Strength), new regulations (Opportunity/ Threat), etc. The SWOT analysis gives the Business Plan evaluator a complete report on the forces and dynamics of that particular segment of industry, and also provides valuable inputs for the strategic marketing plan where the Company will have to fight the competition. The SWOT helps the Company to identify current market opportunities or temporary competitor weaknesses, which may be used to improve its strategic position.

Finally, the competitive analysis should provide a quantitative estimation of the so-called 'Addressable Market', which is defined as the portion of the Available Market that is targetable by the company (addressable market minus the shared market that is, or is going to be, taken by competitors).

Marketing strategy
The marketing strategy is a top-level description of *how* the Company intends to capture (part of) the Addressable Market. It is a list of actions that derives directly from the market and competitive analysis and goes into the planning of how to interface with the market. These planning exercises generate a 'Marketing Plan'.

Once again, in practice we do not have a universal marketing plan structure, but in most cases the marketing activity contains the following three elements: Market Segmentation, Market Targeting and Market Positioning.

In the market segmentation, the Company 'segments' the total addressable market. This segmentation permits one to identify and isolate a group of potential customers who share some of the same requirements; in other words, they can be considered somewhat 'homogeneous'. Typical examples of segmentation variables for consumer markets would be: geographical area, religion, age, family size, gender, life style, language, spending power, buying behaviour, etc.

The second step is evaluation of the attractiveness of each market segment. The process of selecting the most attractive segments is called 'Market Targeting'. Note that the selected segment may not necessarily be the most profitable. The targeting strategy can then be: single-segment concentration (one product for one market segment), product

specialisation (one product for more than one market segment), market specialisation (a set of products for a single market segment), etc.

The last step is the 'Market Positioning', which determines how the company will attract customers in the target segment. Typical examples are cost leadership (selling at lower prices than competitors, e.g. K-Mart), product differentiation, quality (e.g. Hewlett-Packard).

Financial planning and risk analysis
The financial planning deals with the acquisition and utilisation of financial resources. The financial plan contains details about the investment needed to acquire the assets and capabilities to produce and sell the Product. As the risk associated with Technology and Research projects is normally high, it is generally more difficult to acquire financial resources for the project. The level of investment required for the project must therefore be very carefully evaluated. In many projects, there is the possibility to dilute the investment requirement over some period of time, thereby facilitating the acquisition of financial assets.

Investment is one of the most important elements, but not the only one. Fixed and variable costs (for development, production, marketing, sales, etc.) also need to be evaluated together with the projected sales and associated revenues. The financial tools that are usually used are the so-called 'Financial Statements' such as Cash Flow, Profit and Loss (P/L) Accounts, and Balance Sheet. To complete the picture, a set of 'Financial Indicators' is normally given, which are derived from the financial data to provide a measure of the project's profitability. The most commonly used indicators are NPV (Net Present Value), IRR (Internal Rate of Return), Payback Period (also called the break-even point), and Profitability Index. Without going into the technical details, such indicators provide a measure of how and when the money invested will be returned in the Company (in the form of profit), and how much extra money will be generated. Such indicators represent a useful tool for quickly comparing different investment opportunities or projects and selecting the most profitable.

Risk analysis is very often an integral part of the financial plan. Projects can have a high risk profile, meaning that the business involves quite a number of uncertainties and unknowns. For instance, there may be project cost overruns due to product-development difficulties, or lower than expected sales or revenues. There may be new competitors entering the market that were unknown at the time when the decision to invest was taken. New (cheaper) substitute products may appear on the market. The list can be very long!

All 'Risk Elements' should be analysed in detail in terms of their probability of occurrence and impact on the proposed product's profitability and, finally, possible recovery actions. Risk analysis and countermeasures have, in turn, a direct impact on the 'nominal' financial statements, which are then modified to include these uncertainties. Very useful in this domain is the 'scenario analysis' in which adverse conditions are simulated to estimate their impact on the financial indicators and therefore on overall project profitability. These simulations are also called 'sensitivity analyses'. Often, risk analysts use the so-called 'worst-case analysis', which is easier to compute. All variables in the financial statements are replaced with worst-case values and the worst-case financial indicators are evaluated.

More sophisticated risk-analysis methods are being used more often in business today, the 'What-if analysis' being one of them. This analysis provides a better simulation of reality, and even foresees a first level of counter action in response to worse-than-expected market behaviour. For instance, if the projected sales are lower than expected, the marketing expenses will be increased and the investment requirement contracted, since less production power is required. The combined effect on the financial indicators is then computed.

Clearly, each method has its own particular advantages and limitations. There is no universal tool for performing risk analysis. However, the combined use of some of them can provide the necessary confidence for internal and external investors to decide whether or not to fund the project.

Contractual issues in a co-funded contract
The 'General Clauses and Conditions' applicable for all ESA contracts are based on the principle that the full development costs are paid by for the Agency. Under this assumption, the Contractor is the owner of any information and invention produced under an ESA contract, but the Agency, and its Member States/Participating States:

- Retains the rights in licensing all patents and copyrights, obtained by the Contractor as a result of the contract, in the field of space research and technology and their space application.
- Has full dissemination rights over the contract results.

In the case of co-funded contracts, neither of these fundamental principles is directly applicable. A full Agency licensing or dissemination right would in fact allow potential competitors to have access to sensitive technical information and data. This would void the Contractor's competitive advantage in the market place. Full protection of contract results and limited Agency licensing rights have been introduced into the co-funded contracts to protect Industry's competitive position.

Special clauses have been introduced to protect and safeguard the correct use of the Agency's funding:
- The Agency has the right to make a financial audit to verify, at contract or phase completion, the actual funding contribution by Industry in the contract.
- The technology/product developed under co-funded contract shall be available at fair and reasonable conditions to all potential customers residing in the Agency's Member States or Participating States.
- There shall be regular reviews of the Business Plan's validity during the contract's execution.

Other clauses like penalty application, royalties, guarantees, cancellation of the contract and right of reproduction, have also been adapted to take into account the industrial financial participation in the development.

Conclusions

The introduction of the co-funded TRP contract approach is proving very challenging not only for its novelty, but also the varied nature of the problems associated with responding successfully to the new industrial policy requirements. Given the many things that we feel we have learned through this hands-on exercise, in concluding we would like to highlight just a few key issues:

1. In contrast to the traditional engineering approach, Business Plan evaluation is a multidisciplinary task led by a business analyst supported by a team of technical/legal experts. It is the interrelation between the commercial objectives and the technical choices that determines, in most cases, the value and the credibility of the business proposition. For instance, when evaluating a Business Plan for the development and production of advanced solar cells, the technical experts are fundamental to providing a judgement on the suitability and fair pricing of the proposed production facilities. No critical business decision can be taken without considering the technical implications, and vice-versa. The multidisciplinary team should also include legal expertise, as in many cases the IPRs, licensing, import restrictions, exclusivity issues, etc. can have a tremendous impact on the business case's success.

2. Despite the Agency's strict application of security procedures to protect Business Plan information, Companies with proven track records of commercial success have generally been very reluctant to release commercially sensitive information in writing. This is understandable considering that such information is often of huge strategic value to the company. Lack of such information is, however, a 'show-stopper' for the evaluation process, which in turn could put the overall philosophy of the co-funded approach into question.
It was therefore decided to try to overcome this impasse by inviting the Bidders to a presentation to the Agency's Tender Evaluation Board (TEB). A set of questions identifying the missing information was sent to the Bidders with the request to provide answers during the presentation. The companies felt more comfortable with this approach and were then more willing to release sensitive information to ESA. All material presented was configured, countersigned by both parties and left in the custody to the Bidder, with the agreement that such material would, as already foreseen within our procedure, be made available on request to ESA Contracts representatives. In this way, the TEB was able to gain access to all of the critical information needed to complete the evaluation, whilst at the same time the Bidders were certain that there would be no physical dissemination of sensitive information. This solution has therefore proven to be extremely successful and has allowed a thorough and fair evaluation of the various proposals. The effort involved in the TEB is, however, substantially higher than in a traditional evaluation process.

The co-funding approach, like similar initiatives being undertaken within the Agency, is an attempt to provide a first response to the new demands from Member States for more efficient utilisation of public resources, while at the same time supporting European Space Industry in the face of ever-increasing worldwide competition. The new approach is already being applied and we are pleased to confirm that the first results look very good. They indeed appear to confirm the validity of co-funded contracts as a sound and worthwhile approach to supporting European competitiveness in the global space market.

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