

CHIMI is a firm specialized in processing metals. Its products are used in sectors such as electronic, aeronautic, automobile, lightening and biomedical. The R&D activity has for CHIMI a strategic importance, it employees around 90 people and each year it has allocated a budget of around 10% of the total revenues. The budget is realised in a time span of 3 years, and for the period 2018-2020 it has been assumed to allocate to the new projects around 300000 €/year. The technological areas relevant for CHIMI are shown in Tab 1.

| <b>Technological Areas</b>             | <b>C1</b>       | <b>C2</b> | <b>C3</b> | <b>C4</b>       | <b>C5</b> |
|--|-----------------|-----------|-----------|-----------------|-----------|
| Average incidence on R&D costs         | 40%             | 5%        | 15%       | 20%             | 20%       |
| Position with respect to competitors   | Strong          | leader    | Leader    | Tenable         | Tenable   |
| Strategic Relevance                    | High            | Low       | Low       | Medium          | Medium    |
| Appropriability                        | Low             | High      | Medium    | Medium          | High      |
| Collaboration with Industrial Partners | To be evaluated | Active    | Active    | To be evaluated | Active    |

**Tab 1: CHIMI technological areas**

For the year 2017, the manager of the R&D has suggested to activate 3 new projects, concerning 3 different technological areas.

**Project P1. Technological area C2**

It is a project to be developed in 3 phases: basic research (1 year), applied research (2 years), development (2 years). The potential marketing is in the automotive and aeronautic sectors. Looking at the trend of these two sectors: the expected revenues are highly uncertain, with a variability of +10%, -15%.

|  |                         |                  |
|--|-------------------------|------------------|
| Costs basic research                       | 167000 €/ year (1 year) | Prob success 60% |
| Costs applied research                     | 180000 €/ year (2 year) | Prob success 70% |
| Costs of development                       | 260000 €/ year (2 year) | Prob success 90% |
| Revenues attended on average (for 7 years) | 350000 €/ year          |                  |
| Production Costs                           | 30% of the revenue      |                  |

**Tab 2: costs and revenues P1**

#### Project P2. Technological area C4

It is a project of incremental innovation, strongly related to the success of a project already in the pipeline, called PA3. PA3 is an enabler for P2: CHIMI cannot start the development phase of P2, if PA3 has not been completed with success. P2 can exploit an owned patent, still valid for 3 years. After these three years the imitation of competitors cannot be avoided. The commercial success of P2 is guarantee: it is deployed according to specific clients' needs.

|  |                          |
|--|--------------------------|
| Costs applied research                     | 120000 €/years (1 years) |
| Costs of development                       | 340000 €/years (1 years) |
| Revenues attended on average (for 5 years) | 220000 €/years           |
| Production Costs                           | 28% revenue              |

**Tab 3: Costs and Revenue P2**

#### Project P3. Technological area C1

It is a project related to a growing technology, with several uncertain applications. However, the ambits are still not well defined. Consequently, the costs are highly uncertain, because highly related to the application sectors. It is assumed a variability of the revenues around 25% and of costs around 15%. The project could participate to a European call (co-financing of 45% of all the costs of R&D, to not be returned). In this case, it is required to create a consortium with at least 3 industrial partners of 3 different countries and 2 universities. Nevertheless, it is not known the probability of success of this call. It is known that in general the success of the European calls is really low, around 5%.

|  |                           |
|--|---------------------------|
| Costs applied research                     | 270000 €/ years (2 years) |
| Costs of development                       | 260000 €/ years (2 years) |
| Revenues attended on average (for 6 years) | 280000 €/ years           |
| Production Costs                           | 25% revenues              |

**Tab 4: Revenues and Costs P3**

The project already in the pipeline for CHIMI, already approved in 2017, are shown in table 5.

| Project       | PA1 | PA2 | PA3 | PA4 | PA5 | PA6 | PA7 | PA8 | PA9 |
|---------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Technological | C3  | C3  | C4  | C2  | C5  | C1  | C1  | C4  | C5  |

|                              |                |                |             |             |                  |                |             |                |             |
|------------------------------|----------------|----------------|-------------|-------------|------------------|----------------|-------------|----------------|-------------|
| Areas                        |                |                |             |             |                  |                |             |                |             |
| Time to be completed (Years) | 3              | 5              | 1           | 2           | 2                | 3              | 1           | 4              | 1           |
| Phase                        | Basic Research | Basic Research | Development | Development | Applied Research | Basic Research | Development | Basic Research | Development |
| Technical Risk               | Medium         | Medium         | Really High | High        | Low              | Medium         | High        | High           | Low         |
| Commercial Risk              | High           | Medium         | High        | Low         | Really Low       | Medium         | High        | Really High    | Low         |
| Strategic Relevance          | High           | Medium         | High        | Medium      | Really High      | High           | Medium      | High           | Really High |
| Economic Relevance           | Medium         | High           | Really High | Really High | High             | Medium         | High        | Really High    | Medium      |
| Total costs of R&D           | Limited        | Very Wide      | Wide        | Limited     | Very Wide        | Limited        | Limited     | Limited        | Very Wide   |
| Patent                       | Granted        | Pending        | Pending     | No          | No               | No             | Granted     | Granted        | Pending     |
| Application Sectors          | Automotive     | Biomedical     | Electronic  | Electronic  | Aeronautic       | Electronic     | Biomedical  | Electronic     | Automotive  |

**Tab 5: projects in pipeline**