

# Final Panel Consensus Report

## A. Productivity and contribution to the NSTS

The Panel considered CINTESIS as a **very good and original research and education network** bringing together 3 existing units from the Faculty of Medicine of the University of Porto and 5 other higher education and research institutions in Porto (engineering school, nursing school, Abel Salazar Institute of Biomedical Sciences), the University of Aveiro and the University of Algarve. It has 100 integrated members, including 24 researchers previously integrated in other units, organized in 16 research groups performing experimental applied research and in part computational work through four thematic lines on clinical and health services research; ageing and neurosciences research; diagnosis, disease and therapeutics research; data and methods research.

The Panel appreciated that CINTESIS has **engaged actively in knowledge and technology transfer** through the production of a large number of models and computer applications, laboratory prototypes and kits, which are **widely used by health professionals and patients**. Three spin-off companies have been created, but **only two patents** have been registered, which the Panel considered relatively low for an application-oriented unit of this size.

The Panel also appreciated that CINTESIS investigators are **actively engaged in multi-disciplinary training through 6 PhD programmes** (hosting 65 PhD students) **and 9 Master programmes** (hosting 150 MSc students), and that knowledge dissemination has been initiated through an **electronic newsletter** with growing national and international readership although engagement in **public education is insufficient** and should be developed more actively.

CINTESIS teams are involved in a significant number of **international collaborations** with high-quality world-leading institutions in Europe and abroad, particularly in Portuguese-speaking countries in Africa and South America. It has a high-level international advisory board, and its members are actively involved in a wide range of national and international societies.

## **B. Scientific and Technological merit of the research team**

The Panel considered that with 1370 papers and 130 book chapters having received **6283 citations**, the publication record of CINTESIS during the period under review researchers is **very good quantitatively** and increasing in quality, with a **growing number of papers in the highest impact international journals** of the various research fields covered, including medicine, gastroenterology, cardiovascular medicine, health informatics and health information management, but also geriatrics, nursing and nutrition. One quarter of the publications reflect international collaborations. The Panel also noted that the publication record is relatively heterogeneous, ranging from **outstanding** for a handful of investigators, to **below average** for a significant fraction of the integrated members. The Panel was concerned to learn during the site visit from the unit coordinator that **no specific measures had been envisaged to correct** this situation and encouraged him to take proactive measures to stimulate the less productive integrated members to increase their outputs **to reach the standards recommended by FCT**.

The Panel appreciated the **quality and relevance of the proposed strategic programme** as it builds upon the wide range of expertise of the different teams and considered it **achievable** overall given the past track record of competitive research and funding of international standard of most of the teams, and the fact that they have access to **excellent** laboratory and computer infrastructures provided by the supporting institutions at the different locations. This includes equipment for cellular and molecular biology, the use of in vitro and animal models and, importantly, access to patients (adults and children) from different hospitals. The Panel identified however a number of research team activities (G1, G4, G5, G11, G16), which were insufficiently described in the initial proposal to enable a rigorous assessment of their relevance and feasibility, and appreciated to find out that on the occasion of the **site visit**, the unit coordinator had assembled and provided a wealth of supporting documentation to fill this information gap.

Overall, the CINTESIS teams have relied mostly on **FCT and national** funding. The Panel noted that resources collected from the European Union and industry have been **rather limited** for a research unit of this size, with the exception of an ERC starting grant and industrial grants in the area of food sciences, and pointed therefore to the need for the CINTESIS investigators to engage more proactively in the collection of such resources. The Panel was pleased to learn during the site visit that such efforts had been initiated by several principal investigators and group leaders, and encouraged them to pursue them proactively.

### C. Scientific merit and innovative nature of the strategic programme

The Panel considered the proposed strategic programme as **very good and highly relevant to and properly aligned** with the regional, national and international scientific, technological and cultural priorities laid out e.g. in the European Union Horizon 2020 framework programme, particularly in relation to the Smart Specialization of Portugal in the areas of Health and ICT. Many of the thematic line aims are sensible and grounded on advanced expertise of the CINTESIS teams, e.g. in the areas of information technology and evidence-based medicine, although not all components can be considered highly original. The strategic programme is associated with appropriately **ambitious** indicators in terms of publications (planned to double over the next period), PhD theses, industrial and research contracts. The Panel identified the **office on ageing issues CA50+** as an innovative partnership that could yield a number of desired social outcomes and original products and services. The strategic programme is highly interdisciplinary as it covers a wide range of disciplines, particularly in the research groups G1, G2, G3, G14, G15 in relation to clinical studies, but also in G6, G9, G10, G12. The Panel considered that this represents both an opportunity and a significant challenge for effective implementation in a national and international network of collaborations, with the ambition to reach out to Portuguese-speaking countries in Africa and South America, and recommended that careful attention and priority be given to its **effective implementation**.

The Panel appreciated and supported the strategic goal of reaching out beyond the Porto area to engage and generate research capabilities in the under-served regions of Algarve and Aveiro, as it could attract qualified health professionals in these regions and should have a major impact over time. It pointed out that its success will be highly dependent on the **efficient implementation of an appropriate governance** and clear rules for the management of such a complex network of multidisciplinary teams from six institutions operating at multiple sites in Porto and the Northern regions of Portugal.

The Panel found the proposal to leverage the expertise of the 16 teams through the formation of a supporting team of five PhD-level experts in project and data management, technology transfer, national and international funding and relationships **very appropriate and recommended that it should be supported with high priority by FCT and the sponsoring institutions**. It emphasized that this **supporting team based at the Faculty of Medicine of the University of Porto** should be empowered with the mission to ensure that all research groups of CINTESIS can benefit equally from their expertise to develop their activities. The Panel therefore found it **very encouraging** to learn during the **site visit** about the strong and enthusiastic dedication of the PhD-students and postdoctoral scientists of the unit to work together in joint projects toward these ambitious goals, and supports their request to **increase the number** of common meetings and seminar rounds, which are currently been established by the unit leaders.

#### **D. Feasibility of the work plan and reasonability of the requested budget**

The Panel **appreciated** that the strategic programme of CINTESIS is organized in such a way as to ensure the continuation of the activities of the 16 teams originating from the previous 3 research units, incorporating a significant number of new integrated members, a policy that should be pursued through further recruitments and visiting professorships. CINTESIS will thus form a **critical** mass of 100 integrated members, 135 PhD students and 140 collaborators in a network of 6 institutions at different locations.

The Panel considered that the strategic programme of CINTESIS structured in **4 thematic lines is very appropriate**, as it is focusing on basic research for understanding the mechanisms of diseases, and strong lines of applied research such as health technology assessment or clinical and health services, which are well aligned with the Horizon 2020 and national agendas. The strategic programme brings together complementary expertise from different teams at different locations and its thematic lines have clearly defined objectives that - for most of them - the Panel considered **feasible** given the track record of the investigators involved in the previous period. However, the Panel recommended that **measures** should be taken by the unit coordinator and leaders to help some of the research groups to improve the quality of their publications and outputs, and was concerned to find out during the site visit that this had **not yet been initiated more proactively**. The strategic programme is expected to also improve knowledge and technology transfer through the provision of new products and services such as diagnostic tools, medical software, medical devices, and innovative medical methods.

The Panel recommended that constant and significant **attention** should be paid to the **governance and management** of the distributed network and to support of efficient communication organized through videoconferencing, webinar and regional conferences and training workshops, and was reassured to learn during the site visit that such efforts were ongoing. All research groups should **really benefit from the programme** despite the heterogeneity of the members and the geographical dispersion of the investigators. This will be achieved by **hiring 5 PhD-level experts** for a more efficient technology transfer, a better data management, a better access to international funding, and a better communication within and outside the unit. The Panel therefore recommends that the supporting institutions provide adequate administrative resources to ensure that this is implemented effectively.

The Panel appreciated that CINTESIS is supported by **very significant laboratory and computer infrastructures** provided by the 6 partner institutions that ensure feasibility of its strategic programme and should help its teams to become successful partners in national and international grant applications. Given the substantial support provided by the 6 institutions in terms of infrastructure, manpower and administration, the Panel considered that the budget proposed is in line with the strategic programme in terms of human resources and equipment. It should be **complemented by the substantial additional resources** required that the teams should be able to collect from public and private resources with the help of the supporting team. The Panel felt that the initiatives presented during the site visit to obtain competitive funding

and to recruit additional young scientists and visiting professors were encouraging **but insufficiently advanced**, and recommended that they should be further developed more actively in the near future. In addition, the Panel felt that CINTESIS must still make **more substantial** efforts to further developing and improving its governance and management of the distributed network as this will be of prime importance for the future development of the unit to become a internationally recognized institution.

## **E. Impact of the scientific, technological and cultural output**

The Panel considered that newly formed R&D unit CINTESIS, based on its very good previous track record of achievements and level of expertise, has a **great potential to produce further knowledge**, to stimulate and to contribute to the regional and national **economic growth and development**, particularly in the **Smart Specialization** of Portugal in the **Health and ICT** themes.

The ongoing efforts of the unit in terms of knowledge and technology transfer and its dissemination, and the training of young scientists, with particular emphasis and potential on the underdeveloped regions of the countries participating and benefiting from the network managed by the unit in Porto, could have **very significant impacts** for the Portuguese economy and society and should be further developed through increased efforts of all its members and an improved governance.

## Overall conclusions

The Panel considered CINTESIS as a **very good** new translational research unit formed from 3 previous units joined by 24 new integrated members, with a critical mass of 100 integrated members. It is affiliated to six institutions in Porto and the regions of Algarve and Aveiro providing strong support in terms of manpower, administration and facilities.

The Panel recognized that the 16 teams of CINTESIS have a strong record of achievements in basic and mostly applied research in a wide variety of disciplines in health sciences performed through collaboration with prominent international institutions, as witnessed by a large number of publications and citations in high impact journals, although it considered that the output is quantitatively heterogeneous between teams, and should be improved both quantitatively and qualitatively. It was concerned to learn during the site visit that **insufficient attention** had been paid so far to this issue by the unit coordinator, and recommended that proactive measures should be implemented in the near future to correct this, as it may diminish the potential of the unit to reach its ambitious goals.

The Panel appreciated that CINTESIS investigators are actively involved in advanced training through 6 PhD and 9 Master programmes, and substantial knowledge transfer activities through various industrial partnerships, the provision of services, and the creation of spin-offs, although it noted that the number of patents registered so far has been relatively limited for a research unit of this size with a strong focus on applied research and should be improved.

The Panel considered that the **strategic programme** of CINTESIS is well conceived, presented and aligned with the objectives of the Portugal and European Union Horizon 2020 agendas, particularly regarding the Smart Specialization of Portugal in the areas of Health and ICT. Beyond its core focus on biomedical research, health informatics and related ethics, the Panel appreciated that the **strategic programme** also covers nursing, ageing and food sciences as well as computer science. Given the past track record and expertise of the CINTESIS teams and the institutional support they receive, the Panel considered the **programme** as feasible provided that **more** efficient governance and management structures with **clear rules** are implemented.

**Priority** should be thus given to the creation of the proposed teams of 5 post-doctoral experts to support a more efficient technology transfer, a better data management, a better access to international funding and a better communication within and outside the unit. The Panel recommended that their mission should be to ensure that **all** teams benefit from the **strategic programme** to enhance their productivity, whatever their affiliation and location in the network, and was **pleased to find** out during the site visit that initial encouraging steps had been implemented in this direction, and that the **unit coordinator** and leaders provided the required clarifications on the composition of the steering committee; the role of the external advisory committee; and importantly the role of the 5 post-doctoral experts for which support is requested. It was thus **confident** that these were appropriate measures ensuring that the

different institutions will be sufficiently represented in the governing committees and involved in the strategic decisions and orientations. Overall the Panel considered CINTESIS to have **great potential to consolidate its position** as a very good translational research unit of national standing and to strive toward increased international recognition.

The Panel strongly recommended that the CINTESIS investigators engage much **more proactively** in the participation as partners or coordinators in European Union Horizon 2020 consortia, and in developing partnerships with industry to collect the additional resources that are essential to support of their **ambitious strategic programme**.