Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic or of Public Administration

Panel Members

Brian Lee (Chair)	Software Research Institute, Athlone Institute of Technology, and Irish Centre for Cloud Computing and Commerce, Dublin City University, Ireland
Michael Madden	National University of Ireland Galway, Ireland
Mina Vasalou	UCL - Institutional Research Information Service, University College London, United Kingdom
Nazim Agoulmine	University of Evry Val d'Essonne, France
Srdjan Krco	DunavNET, Serbia

R&D Units

Centro de Estudos Organizacionais e Sociais do Politécnico do Porto (CEOS.PP)	Instituto Politécnico do Porto (IPP)
Centro de Investigação Aplicada para a Transformação Digital (ARC4DigiT)	Instituto Politécnico de Viana do Castelo (IPVC)
Centro de Investigação em Ciências da Informação, Tecnologias e Arquitetura (ISTAR – IUL)	ISCTE - Instituto Universitário de Lisboa (ISCTE-IUL)
Centro de Investigação em Média Digitais e Interação (DigiMedia)	Universidade de Aveiro (UA)
Centro de Investigação em Serviços Digitais (CISed)	Instituto Politécnico de Viseu (IPV)
Games, Interaction & Learning Technologies (GILT)	Instituto Superior de Engenharia do Porto (ISEP/IPP)
Laboratório de Inteligência Artificial Aplicada (2Ai)	Instituto Politécnico do Cávado e do Ave (IPCA)
Unidade de I&D em Serviços, Aplicações e Conteúdos Digitais (DiSAC)	Instituto Politécnico de Castelo Branco (IPCB)

**Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic
                         or of Public Administration**

R&D Unit: Centro de Estudos Organizacionais e Sociais do Politécnico do Porto (CEOS.PP)
Coordinator: Amélia Cristina Ferreira da Silva
Integrated PhD Researchers: 41

Overall Quality Grade: GOOD
Evaluation Criteria Ratings
(A) Quality, merit, relevance and internationalization of the
    R&D activities of the Integrated Researchers in the R&D Unit Application: 3
(B) Merit of the team of Integrated Researchers: 3
(C) Appropriateness of objectives, strategy, plan of activities and organization: 3

Base Funding for (2020-2023): 490 K€
Recommended Programmatic Support
PhD Fellowships: 2
Programmatic Funding: 275 K€, including for 1 (Junior) New PhD Researcher Contract.

Justification, Comments and Recommendations
CEOS.PP is a R&D Unit at the Polytechnic of Porto that includes four subgroups i) Law and Business Studies, ii) Information Systems and iii) Languages, Communication and Education and iv) Human Resources – the last being added since the original application was submitted. The group consists of 41 integrated researchers. Their primary research goal is to assist organisations with digital transformation. The Unit receives a high level of support from the Polytechnic.

Contributions for knowledge advancement and/or application; The group has achieved 300 publications in the time period 2013-2018, of which 50 % were ISI or Scopus indexed. Additionally, the Unit participated in scientific committees and are editors of journals. The Panel felt that the number of indexed publications was low for the size of the Unit. The Unit explained that the publishing in indexed journals is not common practice for some research lines in e.g. the legal science area, but the creation of the CEOS will lead to cross fertilisation and increased publication. The lack of information on the ORCID profiles of many IRs (integrated researchers) raises concerns about the degree of research activeness, but this may be due to the above explanation.

CEOS has shown a high degree of inter-disciplinary collaboration in the period 2013-2018 in a number of projects that have involved members from all areas, addressing challenges such as financial literacy, improving communication between school and family, a capability maturity model for hospitals and a semantic model for social solidarity economics.

CEOS also reports a number of consultancy engagements and other activities which resulted in publication of reports and analyses e.g. Diagnostics of labor relations in Portuguese Cooperatives and revision of the legal framework of cooperative and social economy. The relationship of some of these activities, such as the just given example, to the stated research goal of digital transformation is unclear to the Panel.

In general, it is clear that many of CEOS activities have had an impact. However, the cases discussed with the evaluation Panel had not yet generated strong evidence of impact beyond the regional level, and the range of areas covered by the projects and activities is wide and the Panel finds it is not easy to assess their impact and research contribution in all cases. The Panel feels CEOS has not given clear measures to demonstrate impact in some of these cases and that this is an area in which CEOS needs to improve its practise by including clear pathways to impact within the project structures. The Panel also felt the amount of money raised from consultancy and private sources was somewhat low given the range of competencies in the Unit.

Members of the Unit have supervised or co-supervised 2 PhDs to completion and currently are (co)supervising 11 PhDs, the majority of whom are professors in the institution. CEOS are proposing to recruit 5 PhD in the next period. CEOS has protocols establishing a strategic partnership with three Spanish universities to facilitate these studentships. The supervisors promote a culture of publishing and dissemination of research, which is a good dimension of the training.

Generally, PhD students have opportunities to receive training in specialised areas during their supervision. Many of the PhD students are also teaching full time at the institution. At a certain stage of the PhD the Unit may want to use existing University mechanisms available to support those students to fast track their research and/or PhD write up.

The Unit has involved MSc students in Erasmus type projects over many years.

CEOS hosted and organized several high-level international scientific events at ISCAP as well as smaller seminars on specific topics.

CEOS does not report any patents. Prototypes have been developed for some of the above-mentioned projects.

The team has a wide range of competences and has combined these well to deliver a number of cross discipline projects. As mentioned, the publication rate in indexed journals is considered on the low side and a number of authors have seemingly not published at all. In the upcoming period, the Unit may want to support these researchers through mentorship opportunities with more experienced staff.

The Unit has participated in a high number of international projects, primarily Erasmus, and has built up an extensive international network of contacts in Europe and globally. There was some evidence of support from the institution in grant writing that led to new FCT projects. As the Unit begins to consider ambitious Horizon 2020 schemes, support at the institutional level (e.g. teaching buy out) will be important in the Unit's success in competitive funding. Researchers participate in international networks and hosted and organised a number of international events as well as supervising a number of international PhD's. The hospital maturity project, eHISMM has generated interest globally including South America and China. At a national level CEOS has participated in many activities with municipalities, associations, schools and other organisations.

CEOS has: i) the idea that scientific advances occur at the frontier or intersection between disciplines. and ii) that researchers must tackle real-life problems, in order to develop valuable resources for organizations and society. CEOS proposes to adopt a project-based pathway to achieve this, which is laudable and an effective approach for generating novel research ideas. However, its future plans are not very well presented. Several projects are specified as exemplars, but the underlying strategy and actions are not visible. A more structured approach is suggested in order to ensure that the above goals are achieved. Additionally, the Unit may want to be more strategic about the research areas explored and their objectives. Formalising the Unit is an opportunity to evaluate the position of this Unit in a regional, national and international context, and to align the current mission to societal challenges. It is also a good time to assess how competitive the team is in an EU context, and how they differentiate themselves from other research groups in Portugal and in Europe. CEOS did outline a structured approach to H2020 engagement which the Panel found to be sound.

CEOS.PP contains very heterogeneous research strands when compared with the other R&D Units which are part of this review. The Panel consider this could present both an advantage – the Unit can be something of a one-top-shop, offering a package of competences – but it may also diffuse the research focus and appear confusing when viewed from the outside.

The organisation is complex, and the management of research initiation was not described in a manner that was entirely clear to the Panel. Nor is it clear that the sharing of ongoing research activities is organised as well as possible. The Panel recommends that more effective internal dissemination be implemented through more regular events and that the Unit should also perhaps consider some electronic dissemination mechanism.

CEOS described digital services activities that have largely been achieved with public bodies. It was less clear to the Panel how they have engaged with industry in this way. Their plans to increase industrial engagement were not fully described. It is also not obvious that all CEOS activities are actually related to the digital services area. The Panel strongly recommends CEOS to define and articulate a clear strategy to address these issues.

CEOS.PP is a very diverse group and its combination of competencies is unique among the Units reviewed, which gives the Unit an excellent base to grow its activities. It has achieved some good results in the 2013-2018 period. There is a lack of clarity with respect to some issues highlighted above which need to be addressed. The Panel for these reasons classifies CEOS.PP as "Good"

The Panel particularly noted the strong work of Mariana Curado Malta, who is the first of this team to take on the task of writing a Horizon2020 proposal. The approach she described is very good and should serve as an exemple for other members. Polytechnic of Porto may wish to consider what institutional support it can provide for personnel like this,

considering the huge amount of time required to prepare a competitive H2020 proposal, and that success may well require more than one attempt.

The budgeted requested by CEOS was interpreted by the Panel as being in excess of €1 million which is an excessive funding level in this FCT Program. The Panel therefore proposed a funding allocation that is considered proportionate and reasonable taking into account the size of the Unit and the funds allocated to this FCT Program.

Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic or of Public Administration

R&D Unit: Centro de Investigação Aplicada para a Transformação Digital (ARC4DigiT)
Coordinator: Sara Maria da Cruz Maia de Oliveira Paiva
Integrated PhD Researchers: 18

Overall Quality Grade: WEAK
Evaluation Criteria Ratings
(A) Quality, merit, relevance and internationalization of the
    R&D activities of the Integrated Researchers in the R&D Unit Application: 2
(B) Merit of the team of Integrated Researchers: 3
(C) Appropriateness of objectives, strategy, plan of activities and organization: 1

Justification, Comments and Recommendations

Arc4Digit is a new Unit founded in 2018 with the goal to gather IPVC researchers currently working individually or engaged in research activities in other organizations into one team, to combine their strength and boost the overall research activities in IPVC.

The Panel found that the Unit is an union of individual researchers with varied competence areas and research interests, but in its present form the Unit is not well connected through a coherent vision and strategy. The justification for the assessment is given below.

ARC4Digit's mission is to conduct applied research in design, development and assessment of digital services and to facilitate transfer of knowledge to companies.

Contributions to knowledge advancement have been demonstrated through the team's track record of publications and external collaborations. Over the last 10 years the integrated researchers published 370 publications, of which 57 are indexed by SCOPUS/ISI. These publications are mostly dated at the beginning of the period of the last 5 years, at the time when the integrated researchers were working on their PhDs with publications slowing down with the finalization of these studies. In the evaluation meeting the importance of edited books in fostering international networking was discussed by the Unit integrated researchers. In the future the Unit may want to consider a strategy for also publishing in high impact journals and conferences.

Since 2015, the group was involved in a good number of projects given its size, 16, of which 5 international. The total budget attracted was 2.5milEUR. The highlighted projects carried out over the last 5 years are addressing varied domains. Their impact is on the local/regional society/industry, with some impact on the national level. Interaction with international research organizations is present (universities from Spain, Finland, Pakistan). However, there is no evidence of strong research collaboration nor the existence of clear plans of engagement with these organizations is evident. The Unit has no participation in Horizon 2020 projects, with the exception of some experience of two integrated researchers through different research organizations. If participation in these projects is a priority for this Unit, it will be important to raise the research profile of the Unit through publications alongside institutional support to develop capacity building in the team.

Definition of a PhD program is planned for 2022, in the period of consolidation of the Unit. The Unit has 12 master students on average. As master students are mainly working in companies while pursuing master degree, the topics of their thesis is to a large extent driven by the work they do in the companies. This approach, while effective in supporting master students and the local industry, is hampering the Unit to engage in stronger research activities in selected fields. In the future integrated researchers of this Unit may want to consider a joint negotiation of these topics with the companies involved, especially through strategic relationships with MA graduates who are currently based in these companies.

Patents, prototypes, technology transfer and spinouts: Examples of engagement with local industry and society are present but are limited in size, scope and impact. Of notable importance is a collaboration with the public administration to make an inventory of available smart city services and to assess their maturity level as well as the

project addressing monitoring of radon gas in public buildings. One spin-off was created by an ICVP student. However, this was done after the student left the organization. No patents were filed by IRs.

The Unit consists of 18 integrated researchers, 16 collaborators and 7 researchers. The majority of the integrated researchers have shown evidence of publication and active research in the context of the existing projects, mainly driven by senior researchers from organizations external to ARC4Digit. Due to this, the ability of integrated researchers to independently define and drive research activities is evident for a subset of the researchers only. The highlighted papers were of a good quality. However, the overall impact of the publications seems to be limited.

Evidences of active engagement with the local/regional industry are present and diverse, with a potential to grow and create impact. The project addressing traceability of fish (ValorMar) has potential to generate a strong impact on a national and even international level. In the upcoming period the Unit may want to set up mechanisms of impact inside the project structure to facilitate this.

The Unit is addressing a wide range of research domains with a wide set of research topics in each domain. This has served them well in supporting the needs of companies where master students are working. Given the size of the group, and the desire of the researchers to become a Unit, the Panel believes that this approach is not viable in the short term and that it will not result in adequate research outputs. There is a need to develop a research vision and strategy that aligns the expertise of its members (or a subset of the team) with strategic regional, national and international priority areas and objectives. There are good exemples of a research agenda driven by the IRs in the scope of broader projects being executed in other organizations. These activities can be leveraged and aligned with the vision of ARC4Digit.

Currently the group has good examples of engagement with industry sometimes facilitated through media visibility. In the upcoming period a structured approach could be applied that re-establishes these collaborations for research purposes and applies a strategic view on how the Unit can contribute to industry.

FCT's support for 5 PhD researchers is sought to strengthen the research activities of the Unit. The plans provided could present more clarity in regard to which particular domains these researchers will contribute to.

The Panel considers an overall evaluation of "Weak" to be the appropriate at this point in time.

Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic or of Public Administration

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R&D Unit: Centro de Investigação em Ciências da Informação, Tecnologias e Arquitetura (ISTAR – IUL)
Coordinator: Sara Eloy Cardoso Rodrigues
Integrated PhD Researchers: 34

Overall Quality Grade: VERY GOOD
Evaluation Criteria Ratings
(A) Quality, merit, relevance and internationalization of the
     R&D activities of the Integrated Researchers in the R&D Unit Application: 4
(B) Merit of the team of Integrated Researchers: 4
(C) Appropriateness of objectives, strategy, plan of activities and organization: 4

Base Funding for (2020-2023): 473 K€
Recommended Programmatic Support
PhD Fellowships: 5
Programmatic Funding: 285 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

Justification, Comments and Recommendations
iSTAR (Information Science and Technologies and Architecture Research Centre) was established in 2015 and is currently composed of 34 integrated members (and 35 collaborators). It is an ISCTE-IUL Unit in Lisbon which mission is to address multidisciplinary research that combines human, organizational and societal problems. It adopts a user-centered approach to ICT and digital services. The majority of the IR of this new Unit were previously associated with the ADETTI R&D Unit (funded by FCT pluriannual funding which ceased it activity in 2017) joined by other researchers from other ISCTE-UL and other public universities.

During the last period of evaluation the Unit has established itself within several key thematic area namely Digital Living Space (DLS), Complexity and Computational Modelling (CCM), Information Systems (IS), Software System (SS).

The Panel found that the Unit has made very good progress in its research activity that lead to the production of strong research results. These activities have also had a strong national impact and to some extend also some international impacts (through its involvement in several European actions). In the longer term, there are large opportunities for the R&D Unit to increase these impacts considering the addressed multidisciplinary areas.

The justification for the assessment is given below and includes specific recommendations that the Panel believes can aid the group grow into an even more successful research-performing entity since we consider that there is a huge potential in the scientific scope of the Unit.

The quality of the scientific output of this Unit during the last 5 years is considered as very good in general. The R&D Unit members as a whole have had a constant flow of publications, some of them in high impact journals. The Unit did have a clear strategy regarding publication in Q1/Q2 during the previous period.

The Unit has achieved tangible scientific results in the addressed research areas and was able to provide clear facts about the advances beyond the state of art in several areas of investigation. Several multidisciplinary projects have been initiated and constitute a strong ground for the Unit multidisciplinary research (e.g. generative design, citizen participation and fabrication, smart & sustainable villages and tourism, gamification, intelligent information and awareness).

Transdisciplinary and multidisciplinary research that is conducted in the R&D Unit has a high impact in the society. For example, the conducted research in HCI from the perspective of architecture multidisciplinary approach has already been used in several studies with citizens. The activities conducted in several projects funded by EU or FCT (AAL4ALL, IRIS, OLA, VUK) have also a direct impact in the society.

While the majority of the research activities are clearly identified, some of them need to be more concrete in terms of objectives beyond the state of art, methodology and results (e.g. IoT applications). Other research area such as

8

Information System adoption following gamification models have reached a certain level of maturity that should allow the R&D Unit to have major impact in the community.

Among others, contributions in cybersecurity are important also but need to be more aligned with the multidisciplinary objective of the Unit.

Some key contributions, such as ambient assisted learning (AAL), had considerable successes in securing research funding. The R&D Unit has been able to collect valuable scientific data that allow it to propose innovative interactive services to the citizens. This important output of the research needs to be shared at a larger scale with the research community to increase its impact (e.g. sharing collected data sets and results) and visibility of the R&D Unit outside the AAL community.

The group as a whole has a constant flow of publications from year to year. Some of them are in high impact journals which could be encouraged throughout the Unit in the upcoming period.

The strategy in term of publications has permit to the R&D Unit to increase steadily its Q1/Q2 publications as well as the number of journals. The strategy should be maintained focusing in priority on high impact conferences and journals.

The Unit is engaged to some extent with local industry and public organization but the relation is not yet very strong and should be reinforced in the future. Two spin-offs have been created and one patent has been filled by (member of) the Unit which highlights that there is a high potential of collaboration with industry. Nevertheless, it is not clear how these spin-offs are related to the activities of the Unit and whether there is a clear strategy about spin-off and patent applications.

The scientific impact of the Unit at the national and international level is very good. At the national level, the Unit has been able to organize several international events in its related research areas attracting many researchers in the fields (workshops, international conference and summer school). It is worthy to mention the research done on "shape grammar" that represents an innovative approach to design that should be reinforced. In particular there is room for clear collaboration between research groups to develop this concept and make it easier for non-programmers to design with it.

At the international level some groups have engaged in international projects (AAL and H2020 projects) with high impact in several communities and activities. Others are however less engaged in projects either at the national or international level.

The Unit has engaged in the co-supervision of many PhD students (41) and Msc students during the last period. The level of co-supervision is high and the PhD students have shown a clear understanding of the level of excellence they should achieve during their studies. The students have in the majority published numerous conference papers and in some case also journals papers during the 2/3 first years. 15 PhD students have finished their Phd during the previous period.

The Unit is also fully supporting its PhD students in their research activity and funding their travels to conferences. However, it seems that the Unit doesn't have enough funding to support all the PhD students or therefore could only support during limited period of time. Many PhD students are not beneficiating from any funding during their PhD. The Unit should have a strategy regarding the recruitment of PhD students to make sure that they are provided the best conditions to conduct and achieve PhD.

The Unit did have a good strategy in terms of mobility of its researchers to international research centers with a clear objective to increase the Unit knowledge and develop collaborations.

There are 35 collaborators in the R&D Unit but it is not clear how these collaborators are really contributing to the R&D Unit activities and to advancing it.

The majority of the IRs have published during the last period. They have been able to publish papers in very good venues (conferences, journals) some of them are in high impact journals.

Some IRs are very active in gaining funding, but in general the amount of funding is low vs the size of the Unit. Actually, the efforts of the IR seems spread among too many projects or activities that don't allow them to build around big projects with sufficient funding that allows them to be comfortable in conducting their research and funding their projects.

The ratio of PhD researchers to team members (35/61) appears to be low and could be improved provided the R&D Unit could attract more funds.

The IRs have participated to several international standardization initiatives namely MPEG, JPEG and Blockchain, which is a good strategy. However, the output and the impact of these participations and venues should be evaluated.

The strategic plan presented in the applications is very precise and are rational in general. It is well articulated in terms of Strategic Objectives but remains somehow generic in the specific actions to achieve them. One example is the plan indicating that the R&D Unit is going to attract international researchers, but there are no indications about how the Unit is going to proceed. Another example is the plan indicating the R&D Unit will engage with "all" society actors. The plan should indicate what are the specific actors that are the more beneficial for the Unit to engage with them and used means to approach them and on which specific topics?

Many action items are geared towards research funding and increasing profile/internationalization which is very important but once again it is important to be more concrete about the actions to conduct in order to reach the defined objectives.

The R&D Unit should also define a strategy for new projects focusing on few multidisciplinary projects with higher funding for the Unit (which seems to not be the case today).

The R&D Unit did not define a clear strategy in terms of integrating new collaborators in the Unit: It is important to define which, why and for what objective one collaborator is integrated in order to create a strong identify to the R&D Unit.

The budget justification is well reasoned, though the projected EU and National funding seem less than ambitious for a team this size. Some requests for equipment funding are not justified since the site visit has shown that some were already in place (VR room) but there is clear need to well operate them.

The addition of the science manager is a very good idea and an ambitious mission should be defined.

Many action items are geared towards increasing profile/internationalization again through a generic set of actions, without concrete details. For example, it would be worthwhile listing H2020 topics of interest and potential partners (existing and new ones). Further to this, it would be very beneficial to encourage more members of the R&D Unit to submit proposals for funding either at the national or international level to raise more research funding for the Unit.

The proposed organization is good but maybe too complicated (for the size of the Unit) with too many boards. It could be simplified to promote cohesion between the research group and facilitate horizontal interactions.

The Unit wills need a strong support from the institution to build a strong identity and increase the potential of synergy inside the R&D Units localizing all the researchers in the same place with a well-recognized identity in and outside the institute.

iSTAR is a well-established research group that has achieved significant scientific progress and with clear scientific outcomes and social impact. The Panel considers also that the potential of growth and impact of the R&D Unit is big and the Unit should be supported to achieve its objectives.

For all of these reasons, the Panel classifies the iSTAR R&D Unit as "very good".

The Panel did not consider the request for equipment funding within the scope of the parameters of this FCT Program.

Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic or of Public Administration

R&D Unit: Centro de Investigação em Média Digitais e Interação (DigiMedia)
Coordinator: Fernando Manuel dos Santos Ramos
Integrated PhD Researchers: 26

Overall Quality Grade: VERY GOOD
Evaluation Criteria Ratings
(A) Quality, merit, relevance and internationalization of the
    R&D activities of the Integrated Researchers in the R&D Unit Application: 5
(B) Merit of the team of Integrated Researchers: 4
(C) Appropriateness of objectives, strategy, plan of activities and organization: 4

Base Funding for (2020-2023): 383 K€
Recommended Programmatic Support
PhD Fellowships: 5
Programmatic Funding: 226 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

Justification, Comments and Recommendations
DigiMedia is an established group since 2007. Currently it has 27 IR, 36 collaborators and 30 PhD students. During the past decade the Unit have established themselves firmly across a number of key thematic areas that share a common core all taking a human-centred approach used to address a range of socio-technical issues. Overall, the Panel found that the Unit has made excellent progress that has a strong international dimension and in the next period needs to scale up this effort to become an international reference Unit.

The publications submitted as part of the application are in appropriate journals recognised in the relevant field of research. While the methods used are rigorous and well documented, most of the papers could better evidence the originality and significance of the research. To achieve this, stronger connections need to be made between the specific prototypes covered and what these contribute to a broader field of research. In many cases DigiMedia research has connected with industry, not least through its collaboration with AlticeLabs, with clear examples of knowledge transfer to industry. This is also actively facilitated through the University and its technology transfer office who work with researchers directly. There are strong links with local industry, which in a similar way happens through mechanisms facilitated by the university, providing students of the University with opportunities to work on industry projects.

This Unit has achieved excellent social impact nationally and internationally engaging with a range of stakeholders such as health policy makers, teachers and students in Portuguese speaking countries, and scientists living abroad among others, often at scale.

The Unit has an extensive network of national and international partners, and a strong funding track nationally and at a European level whilst participating in relevant scientific events.

Evidenced outcomes of the research include high quality prototypes used to engage stakeholders, 2 patents, and interaction design models.

MA level and especially PhD level teaching was exceptional. PhD students have the academic support of their supervisors, benefit from academic writing training that encourages them to publish their work, and are given the resources to attend academic conferences incentivising them to publish. The quality of the PhD training and ethos of the Unit was further evidenced during the visit through the active community engagement (and social impact) many of the students reported, and the clarity of their research contributions.

As a whole the majority of the IRs (though not all) have been productive over the period evaluated. There has been a strong focus in national conferences in some cases. Given the quality and impact of the research we observed during the evaluation, the team can be more ambitious with their future publication plans targeting regional but also competitive conferences such as ACM CHI, CSCW, ASSETS, DIS that will additionally raise the visibility of their research beyond the European context.

EU funding, in particular, has focused on less competitive calls so far. Given its network of partners, industry links and team profile, there is an opportunity that the Unit engages in competitive Horizon 2020 calls (and its successor, Horizon Europe) which would raise the profile of its research activity. The Unit researchers recognise this is an area for further development. It is the opinion of this Panel, however, that this initiative needs be driven by the permanent and most experienced members of staff to be successful.

The majority of the researchers have contributed to national and international impact. Examples include being founding members of research communities, engaging with the media to raise the profile of the research, and starting a new journal that seeks to target and engage scholars from underrepresented countries to publish.

The organization of the Unit is appropriate in thematic areas that allow cross over. This was evidenced by activities to encourage collaborations across themes. Senior and junior research members benefit from these structures.

In the application, the Unit activity was framed as contributing to user experience around a number of domains, alongside a user-centred approach. During the presentations and PhD discussions, however, research examples were shared that spanned health and wellbeing, accessibility and interaction design, media studies, learning and digital technology. In addition to this, while some activities were design-oriented leading to a prototype, others seemed to be focused on theory development. The unifying goal presented may not capture the contributions of the Unit, or strategically position the Unit with respect to its uniqueness in a European and international context. In the upcoming period it is recommended that the Unit revisits their overall mission statement and reflects its current activity through strategic objectives that respond to regional, national and international priority challenge areas the Unit aligns with.

In terms of budget, external missions are justified to maintain networks and support student conferences. In addition to this, these funds can cover a strategic mission to attend open days for H2020. A reasonable justification is provided for studentships in order to fund 3 out of 15 each year. Two researchers are requested, one with a general social science profile and another one with HCI and grant experience. It is recommended that the Unit explores additional national and industry sponsored options for funding PhD students. Additionally, the Unit could consider a priority area for H2020 activity based on its current track record and strategically recruit new researchers that will strengthen its portfolio in this area.

The Panel established that the team is engaged in high quality research that has led to excellent social impact. This was evidenced through the prototype demonstrators during the meeting alongside the researchers' discussions with the Panel. The Unit has a solid network of community, industry and academic collaborators. Additionally, the Unit has one example of a patent that is currently licensed internationally, which the Panel believes is initial evidence of becoming an international reference Unit if this is connected to an established line of research. The Unit has the talent, the foundation and the potential to strengthen its scientific work and outcomes toward becoming an international reference Unit in the next period reviewed.

For all of these reasons, the Panel classifies DigiMedia as "Very good".

The Programmatic Funding should be applied to hire one new Auxiliar researcher to support the Unit in more advanced activities, and can further be applied to support for participation in infrastructures or international networks in the future and in the other types of support for which the R&D Unit requests Programmatic Funding.

Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic or of Public Administration

R&D Unit: Centro de Investigação em Serviços Digitais (CISed)
Coordinator: José Luís Mendes Loureiro Abrantes
Integrated PhD Researchers: 40

Overall Quality Grade: GOOD
Evaluation Criteria Ratings
(A) Quality, merit, relevance and internationalization of the
      R&D activities of the Integrated Researchers in the R&D Unit Application: 3
(B) Merit of the team of Integrated Researchers: 3
(C) Appropriateness of objectives, strategy, plan of activities and organization: 2

Base Funding for (2020-2023): 459 K€
Recommended Programmatic Support
PhD Fellowships: 2
Programmatic Funding: 165 K€, including for 1 (Junior) New PhD Researcher Contract.

Justification, Comments and Recommendations
CISED is a new Unit founded in 2018 with the goal to gather IPV researchers currently working individually or engaged in research activities in other organizations into one team, combine their strengths and boost overall research activities in IPV.

The Panel found that there is a solid core of research competence in the team. This finding is largely based on the site visit outcomes as the actual CISED proposal submitted to FCT does not fully reflect the strengths and capacity of the team. However, the Unit needs to formulate a more coherent research vision and a strategy to achieve its goals.

The justification for the assessment is given below and includes specific recommendations that the Panel believes can aid the group grow into a successful research-performing entity that we consider it has the potential to achieve.

CISED's vision is to be a center of excellence in digital service area and in development of related technology for the automotive industry.

Contributions for knowledge advancement and/or application: contributions to knowledge advancement have been demonstrated through the team's track record of publications and external collaborations. While CISED did not highlight all research activities in their proposal, the on-site discussion with individual IRs revealed several strong activities done by clusters of IRs or by individual researchers. The activities in the tourism area, quality management, cybersecurity and in the domain of mechanical engineering have produced significant impact so far, mainly on the regional and national level and to some extent on the international level as well. Further activities with potential to generate impact are those driven by the computer science department whose members are involved in a smart city project (through a different organization though). There are further research ideas and proposals in the financial and agriculture domains which have potential to generate impact.

While impact of CISED IRs is evident on the national level and especially regional level, impact on the the international level is more limited. Participation of two research organizations (Tallaght and Salamanca) in the advisory board was highlighted. While this is positive, the details of the actual research collaboration with these organizations are not evident. Moreover one IR participates in a H2020 cyber security project. This particular experience and connections established should be used as the basis for a more organized and targeted push towards participation in H2020.

Discussions with the IRs revealed additional connections with various international research organizations. Of particular importance are relationships established in the tourism sector as well as through activities of individual researchers with the institutions from which they obtained PhD degrees.

The publications examined by the Panel were of good quality, with several publications in international journals with high impact factor (done by individual IR). The group has strong publishing record of book chapters.

Advanced Training (PhD level): While it can be challenging for some Polytechnics to engage in PhD supervision, several CISED IRs are co-supervising PhD students in collaboration with different universities. The current PhD students who were interviewed by the Panel demonstrated strong enthusiasm for their educational experience and mentoring they are receiving.

All IRs are involved in master students research supervision mainly in the frame of collaborative projects with industry contributing to the advance of knowledge and application in their areas of expertise.

The proposal and the introductory presentation were organized with a focus on collaboration with local industry (mainly branches of international companies active in the automotive sector). It is commendable that representatives of several companies took time to take part in the evaluation, thus showing commitment to collaboration with CISED. While initially it seemed that the actual collaboration is still in the planning phase only, discussions with individual industrial partners revealed examples of joint activities that are already in progress (e.g. Sofinse).

The Unit consists of 41 integrated researchers and 16 collaborators. The majority of the group has evidence of publication and active research. The presented papers were of a good quality. Domains like tourism and quality management are particularly strong on impact (society, economy) and publications.

Evidences of active engagement with the local/regional industry are present and diverse, with potential to grow and create a very strong impact. Contribution to the wine and in general tourism area is particularly strong.

A few papers (quality management domain) were published in highly ranked international journals. Individual researchers have shown evidence of international collaboration, including participation in H2020 projects (not in the current group though). The Panel believes that there is a depth of research competence in the group with potential to produce high quality research.

The Panel found that the group was missing a coherent articulation of its research vision and mission. There are a number of research area strands within the group, but they are not very well knit together. The Panel feels the group needs to adopt a more focused research vision and to align its research activities around a few selected key areas and also to better align the activities within the group.

The Panel was unclear about the criteria the group will use to propose projects and felt that the process was somewhat random and ad-hoc. The group does not seem to have a clear strategy for which areas to target. This is linked to the previous comment about the need for the group to hinge its research around a small number of key areas. The group should identify a small number of calls (H2020 or national) and target those. The group should also identify the strategy and actions needed to take to get visibility in the highly competitive H2020 process.

In addition to the expressed intention to take part in H2020 projects, CISED should make clear short and medium-term plans in relation to the H2020 topics and calls they want to address. Based on this, the group will have to adapt the scope and the descriptions of own research. Strong connections with the local industry could be used to offer piloting sites for the smart manufacturing focused proposals, thus giving CISED a good starting point when looking for H2020 partners. The experience and resources the group has in the tourism sector can be used in a similar manner.

The group submitted two patent applications, with an additional one being prepared. This is very positive, and the Panel encourages the group to continue this activity. However, a clear strategy on commercialization of these patents should be made.

Several IRs are co-supervising PhD students. This activity should be continued and further strengthened. Currently, the group has a few PhD students, mainly working part-time on their research.

The budget is described briefly and in relatively vague terms. It is not clear to which domain the planned new hire will contribute to.

The group has a good competence and potential. While the impact on regional and national level is present and adequate, impact on the international level has yet to develop. The strategy and organization to achieve the full potential of the group have to be significantly improved. For this reason, the Panel consider an overall evaluation of "Good" to be the correct quality grade to apply to CISED at this point in time.

The Panel particularly noted the strong work of Professor Nuno Melao in the area of Quality Management and Excellence.

Having in mind the size of the Unit and the need to expand and fortify research activities, being able to manage 2 PhD fellowships and to hire 1 Junior Researcher will contribute to the objectives.

The Programmatic Funding provided can be partially used to enable the Unit to obtain specific equipment required to perform research activities.

Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic or of Public Administration

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R&D Unit: Games, Interaction & Learning Technologies (GILT)
Coordinator: Paula Maria de Sá Oliveira Escudeiro
Integrated PhD Researchers: 11

Overall Quality Grade: GOOD
Evaluation Criteria Ratings
(A) Quality, merit, relevance and internationalization of the
    R&D activities of the Integrated Researchers in the R&D Unit Application: 3
(B) Merit of the team of Integrated Researchers: 2
(C) Appropriateness of objectives, strategy, plan of activities and organization: 3

Base Funding for (2020-2023): 124 K€
Recommended Programmatic Support
PhD Fellowships: 1

Justification, Comments and Recommendations
GILT is an established research group since 2005. Currently it has 11 IR (integrated researchers with PhD), 11 collaborators and 4 PhD students. During the past decade the Unit have established themselves as a relevant national and international Unit in the field of learning technology and most notably serious games. Overall, the Panel found that the Unit has made good progress that has an international dimension. In the next period it needs to develop a more explicit strategy for research based on its current activity.

The Unit aims to develop multidisciplinary knowledge through applied research in learning technologies. The publications during the past period did not reflect the full strength of this multidisciplinary knowledge. The prototypes developed within the Unit have presented many technical challenges that the team has developed expertise in, but this knowledge has not always led to strategic publications with a technical contribution. During the meeting, the Panel appreciated that the Unit IRs mostly have a software engineering background with some engagement with user-centred methods mainly to validate user interfaces rather than to contribute generative ideas for research. In the next period the Unit is recommended to identify the objectives that deliver its main thematic area (to develop learning technologies) by aligning this with the current expertise of the Unit.

The Unit has generated very good social and economic impact addressing targeted societal challenges. It has engaged with a number of national communities and beneficiaries such as the deaf association, municipalities etc. The research has also gained good media attention, fostering this engagement. This is a strong dimension of the Unit and in the upcoming period the research team may want to build mechanisms into each of their projects to strategically foster this level of public engagement in the communities impacted by their research.

The Unit has an extensive network of national and international partners, whilst participating in relevant scientific events. They have also previously organised conferences and led EU-level networks in one of their focal areas, serious games, which has raised their visibility.

Technology developed by the Unit has led to patents and spin offs led by a member of the Unit. During the evaluation meeting it was unclear how the technology was licensed and if the polytechnic owned the IP, which raises questions about the stage or maturity of this spin off. Additionally, there is a good strategy in place for technology transfer with the municipality from one of the projects.

Several PhD students have completed their PhDs at the Unit successfully, mostly on technological topics. Some of these students are connected with on-going research projects, ensuring the authenticity and feasibility of the research.

So far it seems there has been a focus on quantity of publications (also reflected in the monitoring metrics) and invited opportunities to publish. High impact publications should be a priority in the upcoming period with a focus on quality, e.g. top ACM conferences, journals with high impact factors. Some of the applied research carried out has led to strong social impact, which suggests there is a good foundation to take a more strategic approach on future publications. The

Unit may want to consider facilitating research visits from experienced EU colleagues (e.g. through ERASMUS) who can build capacity in the research team with respect to publishing. The degree of impactful scientific output of the integrated researchers is not consistent, though it is enough to evidence that the majority of the team is active. Several of the researchers did not have online CVs included in the application and a few have not published in the period reviewed. In the next period, these IR should be mentored and supported to develop a publication record.

The Unit has a strong funding track record nationally and at a European level with funding with the biggest funder being Erasmus+. There is good expertise in coordinating these smallscale projects.

Team members have received national prizes for their work. Although the national or international activities of the IR were available within the application only, rather than the individual profiles (e.g. coordination of projects, conferences), in the evaluation meeting it became clear that some of these activities are jointly driven by the team.

A systematic analysis of the Unit organization was provided, and the connection between the previous period and the one coming was made. The aims of the upcoming period are clear and complementary to the achievements so far made. In terms of the coordination of the Unit, given the small size, the informal structure is appropriate.

There is a common theme on learning that IRs agree to align with. Besides the topic alignment, in the future the Unit may want to be strategic about the research areas explored and their objectives. Formalising the Unit is an opportunity to evaluate the position of this group in a national and international context, and to align the current mission to societal and technological challenges. It is also a good time to assess how competitive the team is in an EU context, and how they differentiate themselves from other research groups in Portugal and in Europe.

The Unit aspires to gain Horizon 2020 funding. One of its strategies has been to involve advisory members and develop EU networks involving individuals who may have this experience. Additionally, it is noted that until recently there was no clear indication whether the Unit, based at a Polytechnic, had institutional support to participate in H2020 applications. The Unit may want to take a more ambitious and proactive approach by attending H2020 open days on topical areas, identifying relevant H2020 calls and initiating ideas within its own network that align with its current expertise. Additionally, to participate in H2020, the team may need to develop its research profile and capacity. In the future a more ambitious plan can be developed for attracting high quality PhD students and post-doctoral fellows.

This is a small team that has achieved good progress in technological outcomes and social impact. The research contributions of the work have not yet materialised to their potential. The Unit has a very good network mostly with other serious games academics in a European context. Given the good foundation it has developed, in the coming period the Unit should focus its efforts on strengthening its position as a research group.

For all of these reasons, the Panel classifies GILT as "good".

Although the R&D Unit did not request PhD fellowships, the Panel is granting one. This is intended to provide resources to the Unit that will boost its research activity and outcomes in the upcoming period.

Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic or of Public Administration

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R&D Unit: Laboratório de Inteligência Artificial Aplicada (2Ai)
Coordinator: Joao Luis Araujo Martins Vilaça
Integrated PhD Researchers: 14

Overall Quality Grade: VERY GOOD
Evaluation Criteria Ratings
(A) Quality, merit, relevance and internationalization of the
     R&D activities of the Integrated Researchers in the R&D Unit Application: 5
(B) Merit of the team of Integrated Researchers: 4
(C) Appropriateness of objectives, strategy, plan of activities and organization: 4

Base Funding for (2020-2023): 165 K€
Recommended Programmatic Support
PhD Fellowships: 3
Programmatic Funding: 285 K€, including for 1 (Auxiliar) New PhD Researcher Contract.

Justification, Comments and Recommendations

2AI is a group of 14 integrated researchers who are academic staff of IPCA in Barcelos, and who have been conducting their research in other universities until now. They are strongly motivated to bring their research together in IPCA, under the theme of Applied Artificial Intelligence. The Unit is at a nascent stage and has energy and passion about their work like that of a startup company. There was evidence of institutional support and commitment, such as: the engagement of a VP at the meeting; substantial space granted to the Unit, with clear 2AI branding; and the engagement of the IPCA Knowledge Transfer Office. It was also noted that IPCA is working to establish workload policies – these will be required to ensure that those who engage in research are provided with the mental space to work.

2AI is a new Unit and several of its team of 14 IRs are relatively young, having completed their own PhDs within the past 5 years. Relative to their early stage, the quality and merits of the team's R&D activities are impressive, particularly with reference to the 5 contributions that the team put forward.

Since early 2018, they have published 19 more journal papers, 20 conference papers, secured €2.6m funding, filed 1 provisional patents, and conducted 2 tech transfer events. All of this demonstrates a strong and growing level of research activity.

These have been demonstrated through the team's track record of publications and external collaborations. Contributions to knowledge application have been demonstrated in a successful set of research projects that were conducted in collaboration with industry partners, on applications of AI in medicine and manufacturing inspection.

The publications examined were of high quality, and appeared in high-impact peer-reviewed conferences and top-tier journals. The team have a meeting room designated as a journal club, which is an effective way to showcase their own work and share relevant papers of others.

While it can be challenging for some Polytechnics to engage in PhD supervision, 2AI have established appropriate alliances with partner universities. They are also proposing a new PhD in Applied AI, with the target of accrediting it in 2020. This will be an industry based PhD, with topics proposed by companies. The current PhD students who were interviewed demonstrated strong enthusiasm for their educational experience and mentoring they are receiving.

The team has a strategy of engaging with students at undergraduate and MSc level to create a pipeline of PhD researchers. IPCA has 4 relevant undergraduate degrees: computer science; medical informatics, games; electrical engineering, and similar MSc degrees. Student numbers appear strong, with 100 MScs graduating annually.

Organization of conferences, colloquia and/or seminars: 2AI propose to establish a new conference on applied AI, though it is not entirely clear why this would be more worthwhile than engaging with one of the top-level conferences in the field and perhaps establishing a workshop series that would be linked with such a conference.

The team demonstrated very high-quality prototypes. For example, one of the projects, on characterisation of blood samples, has led to a spin-out company. That and the KidneyNav project (which also had a high quality prototype) have led to patents, and the KidneyNav technology is in the process of being licenced to a multinational corporation. Computer vision projects for the automotive industry regionally also demonstrated strong technology transfer.

The iDroneExperience event, while requiring an enormous amount of work, was extremely impressive as an outreach event, and the Panel encourages 2AI to continue running it.

It is also worth noting that the team has achieved very high impact for many of its activities with very small teams and very small amounts of investment, 1-2 PhD scholarships.

The scientific merit of the team is very strong, as demonstrated by the outputs of the team's scientific activities that were described earlier, including: publications, research funding successes, prototypes, patents, and licenses.

Companies and non-profit organisations within the region have had sustained and valuable collaborations with the members of the team, and 2AI are establishing a reputation as a Unit to go to for applications of AI.

Evidence of international impact of the research includes: (1) Algorithms used by their collaborators in medical schools in Kings College & Leuven; (2) Same algorithms used by a group in Dresden who did not participate in original research, now applied to a different application with 2AI; (3) Have licensed some software to a Swedish company; (4) ongoing collaborations with multinational companies such as GE, Philips and Bosch; (5) licensing of KidneyNav to an international company; (6) methods to detect pathological stress using smartwatches has led to them being embedded in watches from a company in Israel with other possible opportunities in Finland; (7) the blood product won prizes internationally at the Microsoft Imagine Cup; (8) they have won a prize in an international contest from an industrial robotics company.

The goal of 2AI is to pursue fundamental advances in AI with applications in technically innovative solutions. In pursuit of this, their work organised into 3 Research Areas and 3 cross-cutting Impact Areas, forming a matrix. The Research Areas are: Intelligent systems; Human-AI collaboration; Robotics. The Impact Areas are: Health; Industry; Security.

The team is working to build an ecosystem around their research, to build their own profile and foster collaboration, with plans to host events; create a national AI cluster; create advanced courses; host international speakers.

Challenges and points to improve:
- While the motivation for centralising the 2AI members' research in this lab is clear and commendable, it is noted that many of their current projects arose from "corridor conversations" and exposure within the universities where they are distributed. It will be important for the team to engage with universities within and outside their region, to avoid becoming isolated. They will need to develop a strategy not just to maintain existing links, but to establish new ones.
- The Panel strongly encourages the team to engage in Horizon2020 research, as a way of securing substantial multi-annual funding for PhDs, postdocs, travel and equipment, and to build international exposure. The team is now searching for international partners, and are starting to develop ideas. They are looking forward to calls in personalised medicine and gamification. Recommended actions include: contact your H2020 National Contact Point, attend H2020 Open Days, and reach out actively, "cold-calling" as was done to engage with Dresden.
- The 2AI structure includes an Ethics committee. However, to avoid any risks of conflicts (actual or perceived) this responsibility should be centralised within the Office of the VP for Research.

The Panel determined that the majority of the 2AI are performing innovative R&D of recognised quality and merit, and have contributed to the advancement of knowledge and its application. This has been demonstrated by high quality publications and the development of high quality demonstrators/prototypes arising from strong engagement with industry and non-commercial collaborators.

The team has existing collaborations with KU Leuven, King's College London and Dresten, who are collaborating with 2AI to extend work in new applications. In addition, 2AI researchers have licenced technologies to foreign and multinational companies. if 2AI continues in this vein into the future, they have the potential to become an international reference.

The plans being pursued by the team are clear and appropriate to its goals.

The request for infrastructure access to quantum computing and similar resources was not justified in the rest of the proposal. Publishing and open access costs seemed too high.

**Evaluation Panel: THEMATIC AREAS - Digital Services - Social, Cultural, Economic
or of Public Administration**

R&D Unit: Unidade de I&D em Serviços, Aplicações e Conteúdos Digitais (DiSAC)
Coordinator: Fernando Reinaldo Silva Garcia Ribeiro
Integrated PhD Researchers: 11

Overall Quality Grade: WEAK
Evaluation Criteria Ratings
(A) Quality, merit, relevance and internationalization of the
    R&D activities of the Integrated Researchers in the R&D Unit Application: 2
(B) Merit of the team of Integrated Researchers: 3
(C) Appropriateness of objectives, strategy, plan of activities and organization: 2

Justification, Comments and Recommendations
DiSAC is a new Unit founded in 2018. Seven researchers have previously been engaged with other FCT centres. DiSAC has a major goal to make a significant contribution to the region. The Panel found that that there is a solid core of research competence in the team and a high degree of enthusiasm. However, the degree of research impact over the previous five years is somewhat low. Also, the Unit needs to formulate a more coherent research vision and a strategy to achieve its goals. The justification for the assessment is given below and includes specific recommendations that the Panel believes can aid the group grow into a successful research-performing entity that we consider it has the potential to achieve.

Much of the research that was presented has emerged from undergraduate research projects. Many such projects have had additional features added by later projects to the extent that they now serve as frameworks for larger scale developments. There has, for example, been a development for the Naturtejo national park and some research work on Enterprise Architecture was done as part of PICB computerization of the business process of the institute. This approach is promising for the Unit and has potential to provide a base for significant societal impact. It is however somewhat early in its lifecycle at this stage and the degree of impact so far is therefore somewhat lower. In the future the research group may want to consider including activities that will foster social impact directly in the research and project structures. Members of the group have also assisted the City Council of Castelo Branco to update a system, made by the same members, that assists in the drawing of the region's well-known embroidery works.

The Unit engages with industry through MSc projects. However, such participation was lower than the Panel understood from reading the funding application. The group clearly has strong engineering capabilities, but it needs to strengthen its research capabilities in the addressed topics.

The Unit has promoted scientific research in the area, including involvement in the organization of INFOTEC, a three-day technological forum which brings, annually, hundreds of high school students to the PICB. The Unit has also worked with the institution to facilitate direct contact with schools to publicize the opportunities of the college. Other activities in this area include the organization of a hackathon, where the goal is to solve a real problem, over three days, proposed by a regional company. These activities are considered to have high social impact as they reinforce the strategic mission of the Unit and the polytechnic.

Members of the group have been members of a significant number of scientific committees (80+ in the last 5 years), international Journal Editorial Boards, reviewers of Indexed Journals and events, and were involved in the organisation of several events.

The greater majority of the group has evidence of publication. The presented papers were of a good quality, which combined with the publication track record lead the Panel to believe there is a depth of research competence in the group with potential to produce high quality research. Some group members have not published in the last three years and this is an area of concern that should be addressed, for example through mentorship by more experienced members.

The degree of internationalisation is limited. There is evidence of some networking with Polytechnics in other countries e.g. Ireland and Finland. However, it not at all clear that this has led to any subsequent meaningful research

collaborations. There has been engagement with conference technical review participation as well as publications. The group is also lacking a national research profile.

The Panel found that the group was missing a coherent articulation of its research vision and mission. There are a number of research area strands within the group, but they are not very well knit together. The Panel feels the group needs to adopt a more focused research vision and to align its research activities around one or two key areas and also to better align the activities within the group. This would also allow the team to shape the direction of future student projects and postgraduate work, to build up a stronger research portfolio around this theme.

Some such possibilities that occurred to the Panel include the possibility to align the IoT activities of the group to the Agriculture domain where the Institution already has a very strong experience. This is a fast growing domain and could create many research opportunities. Another possibility could be to exploit the learning research capability of the group to develop interactive learning applications. Collaborations with active University researchers or faculty from the education department can introduce the interdisciplinarity required to publish the quality research outcomes. Furthermore, the Panel noted that even the ongoing activities of the group could be better aligned as e.g. the IoT lab could be linked more closely to the proposed IoT research laboratory with the proposed Augmented Reality Forest Fire Discover project. The current, generic, research makes it very difficult for the group to differentiate itself from other digital services and application groups at the national level.

The Panel was unclear about the criteria the group will use to propose projects and felt that the process was somewhat random and ad-hoc. The group does not seem to have a clear strategy for which areas to target. This is linked to the previous comment about the need for the group to hinge its research around a small number of key areas. The group should identify a small number of calls (H2020 or national) and target those. The group should also identify the strategy and actions needed to take to get visibility in the highly competitive H2020 process.

The Panel felt that plans to grow the research capacity were not sufficient. The group explained why they have not proposed to recruit a PhD researcher via this call i.e. that they believe they should already be aligned with an existing PhD program. The Panel considered this entirely reasonable. However, the Panel felt it would be beneficial for the group to engage with PhD students, as it represents a natural extension from undergraduate projects and postgraduate theses, and it enables much greater capacity for high level research than when busy professors do it by themselves. If professors can agree with former PhD advisors to be co-supervisors, they would be able to offer PhD students the opportunity to be registered in a prestigious university while not having to travel there frequently. For collaborators in the other university, the benefits are additional research and publications without much extra work and without securing extra funding for scholarships.

In the application the Unit requests support for hiring "one more fellowship". However, it was unclear how this fellow would be used. The Panel considered the other items in the planned activities as valid.

Although the Panel feels that the group has a good competence and potential and is well supported in its ambitions by PICB, according to the evaluation criteria specified by FCT, the Panel considers that the research group needs to address the weaknesses pointed out in order to grow to fully achieve this potential. For this reason the Panel consider an overall evaluation of "Weak" to be the correct quality grade to apply to DiSAC at this point in time.