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ARTICLE

## Payment types included on technology licensing agreements and earnings distribution among Portuguese universities

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**Abstract** Knowledge and technology transfer practices between universities and industry are aimed to enhance the value of research and development outcomes. They allow researchers and universities to obtain resources and revenues through the establishment of licensing and cooperative research and development agreements. The main objective and contribution of this paper is to provide evidence on what are the main payment types in use by university Technology Transfer Units (TTUs) ensuring a comprehensive overview of the concepts and practices under assessment. This approach also gave us the opportunity to know the earnings distribution among the Portuguese public universities, and to list different dispositions influencing the value of a licensing agreement. Interviews to eight Portuguese university TTUs have been done as a way of perceiving from an insider perspective the issues that this paper wants to emphasize and an extensive literature review has been done, which included the review of the intellectual property regulation of most Portuguese public universities.

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## 1. Introduction

Research and development (R&D) is the predecessor of new knowledge, patents and technology that might be converted into innovations, enhanced products or explicit or tacit knowledge. To leverage the value of R&D outcome evaluation practices and methods may be used to combine the unique features of an invention or technology with the needs and interests of different organizations. Foreseeing this end, universities have adopted knowledge valorization strategies to foster the practical application of research and development results. In this context, technology evaluation and licensing activities allow research staff and universities to achieve revenues by means of the establishment of technology transfer agreements. In order to better understand this process and to improve the access to information on specific practices to support the commercialization of inventive activities this paper aims to provide evidence on what are the main payment types in use by university Technology Transfer Units (TTUs), and also to provide knowledge regarding the earnings distribution among the Portuguese universities, and to list different dispositions influencing the value of a licensing agreement. We noticed that the literature review on these issues is rather fragmented, in the sense that they usually isolate a limited number of factors to treat them as independent variables (Wright, 2014). It is this gap that the present paper intends to address by clearly stating the payment types in use by the Portuguese TTUs and by stating the earning distribution among Portuguese universities.

## 2. Methodology

The study involved an extensive literature review and the collection of complementary information by enquiring the heads of staff of eight university TTUs of Portuguese universities, employing a semi-structured survey. The data has been collected between October 2016 and February 2017.

The eight TTUs addressed were bond to eight Portuguese universities and they all have answered the semi-structured survey, namely:

1. University of Minho – TecMinho
2. University of Porto: UPIN
3. University of Aveiro: UATEC
4. University of Coimbra: DITS
5. University of Beira Interior: Innovation and development office
6. University Nova of Lisboa: RIA – Research and Innovation Accelerator
7. University of Évora: Technology transfer office
8. University of Algarve: CRIA

This sample was purposefully chosen due to the high regional and national influence of the universities, and due to the experience and ability of the TTUs to provide data that expand the understanding of technology transfer processes. Six out of the eight universities appear regularly in world rankings of the top 1000 universities (CWUR, 2015).

The semi-structured survey was divided in two parts, one focused on technology evaluation methods and practices,

and the other one focused on licensing agreement payments. On both parts we used a Likert scale to classify the frequency of use of each issue under analysis. The higher the value, the higher were the frequency of use, in a scale between 1 and 5.

The approach was exploratory and descriptive, but also analytical in the sense that it states the issues at stake on the establishment of a payment structure on technology transfer agreements, and a statistical analysis has been done using the One-sample *T*-tests for the means of relevant variables. IBM SPSS Statistics 19 has been used to perform this analysis.

As a framework for the One-sample *T*-test analysis we have used throughout the article two hypotheses, considering a 95% confidence interval:

**H0.** The average frequency is equal to 3, the payment is frequently included on technology transfer agreements by the TTUs who participated in this study.

**H1.** The average frequency is not equal to 3, the payment is not frequently included on technology transfer agreements by the TTUs who participated in this study.

This approach allowed us to identify the types of payment used by the TTUs in licensing agreements.

The intellectual property rights regulation of all the public Portuguese universities, with the exception of the University of Azores and University of Madeira, have also been reviewed to identify the earnings distribution arising from licensing agreements.

## 3. Payment types

When defining the payment structure we must consider different dispositions which might influence the licensing agreement value. Some of those dispositions are:

- At a technology level: the invention scope, territorial rights and protection length, the level of exclusivity conceded to reproduce, modify, make further R&D or to develop new products based on the invention, the technology development stage, the level of complexity and the skills required to use it, its robustness to operate in different environments, its friendly use, easy and intuitive reproduction and packaging, the number of technologies that must be integrated with the invention to obtain a full commercial product, the possibility of mass production, the compatibility with existing systems, the risks and the costs inherent to future developments, and its social and environmental impact;
- At a market level: the present and emergent competitive technologies, the technology strategic importance, the differentiated applications resulting from the invention and the industries envisaged, the applications market size and growth rate, the emergent and declining customer segments, the strength of existing firms and brands, the marketing, distribution and sales complexity, the applications life cycle and their revenue streams.

These are some disposition affecting the payments value, but there are other dispositions, such as the rights over

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