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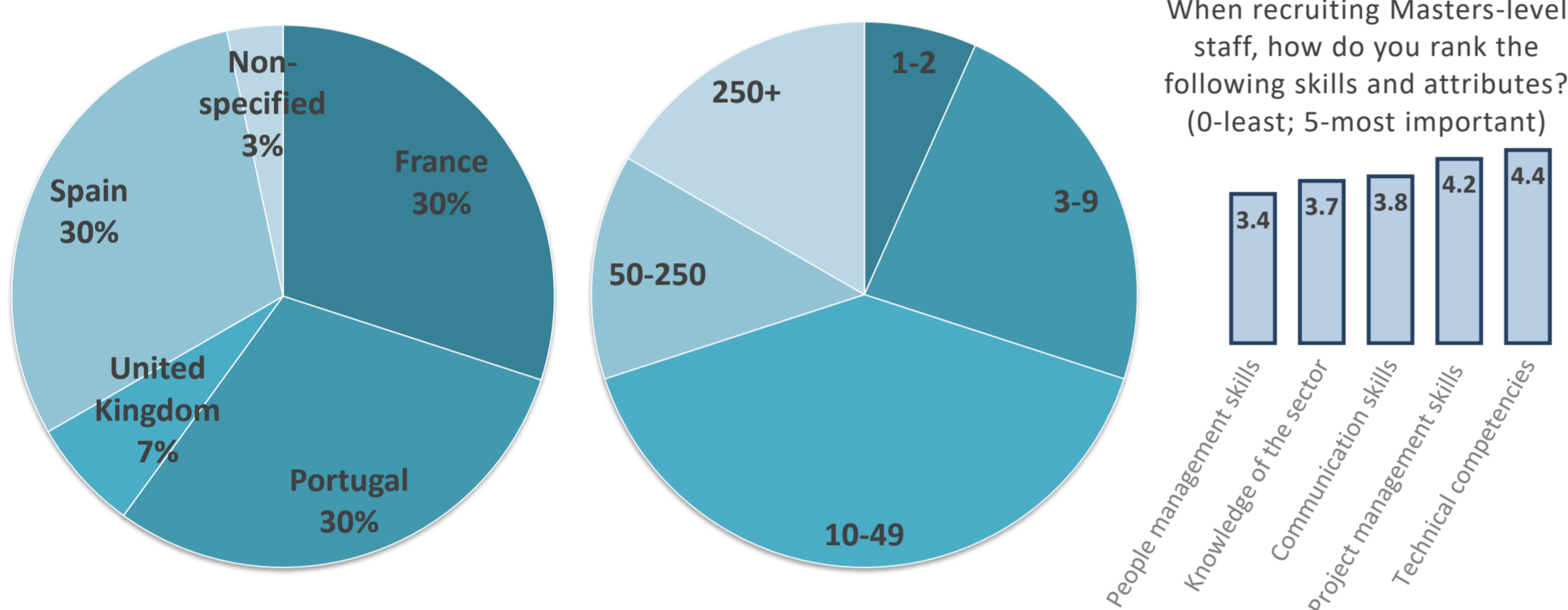
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Introduction

Blue biotechnology and aquaculture are global growth industries in the blue economy with an increasing requirement for a highly skilled workforce. In recognition of this, and as an outcome of the *Blue Growth Strategy* launched by the European Commission [1], the *Executive Agency for Small and Medium-sized Enterprises* (EASME) launched the *Blue Careers in Europe* call as part of the *European Maritime and Fisheries Fund Work Programme 2016 to develop educational programmes that address the skills needs of people already employed in or aiming to embark on a career in the blue economy*. Prior to the development and introduction of a new *Applied Blue Biotechnology Masters II* programme at the University of La Rochelle, the *Blue Biotechnology Master for a Blue Career (BBMBC)* consortium aimed to perform a survey of skills gaps perceived by blue biotechnology and aquaculture employers to inform programme structure and content.

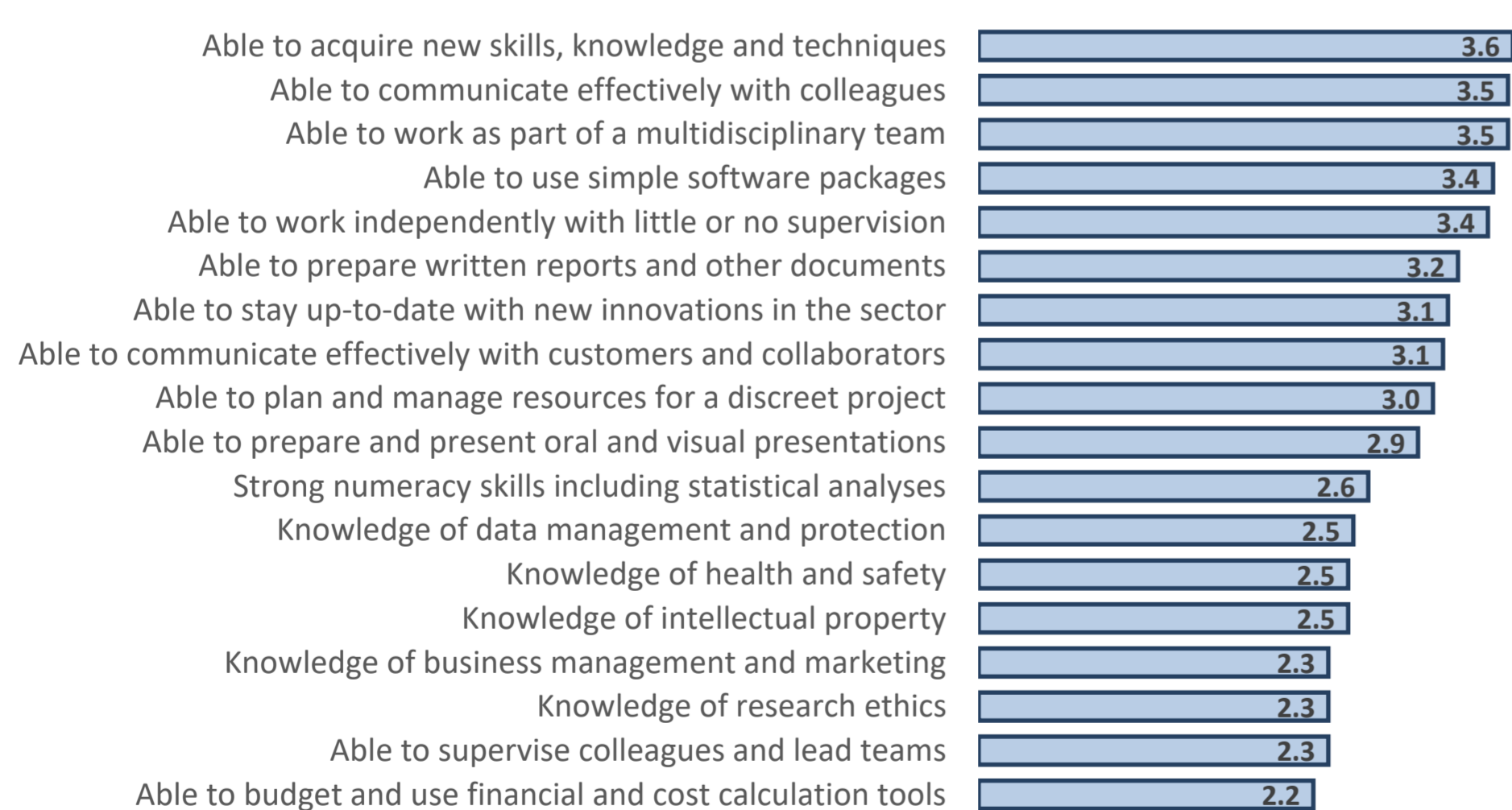
Results

In total, 30 validated responses were received from blue biotechnology enterprises of varying sizes across Europe.



The most important of five broad skills and attributes for a new masters-level recruit were 'Technical competencies' (defined as the 'ability to perform key methodologies and learn new techniques') and 'Project management skills' (defined as the 'ability to plan and run a project on time and budget'). Amongst the most important 'general' skills were: ability to acquire new skills, knowledge and techniques; working in a multidisciplinary team; strong interpersonal communication skills; ability to work independently; and competence in use of simple software packages.

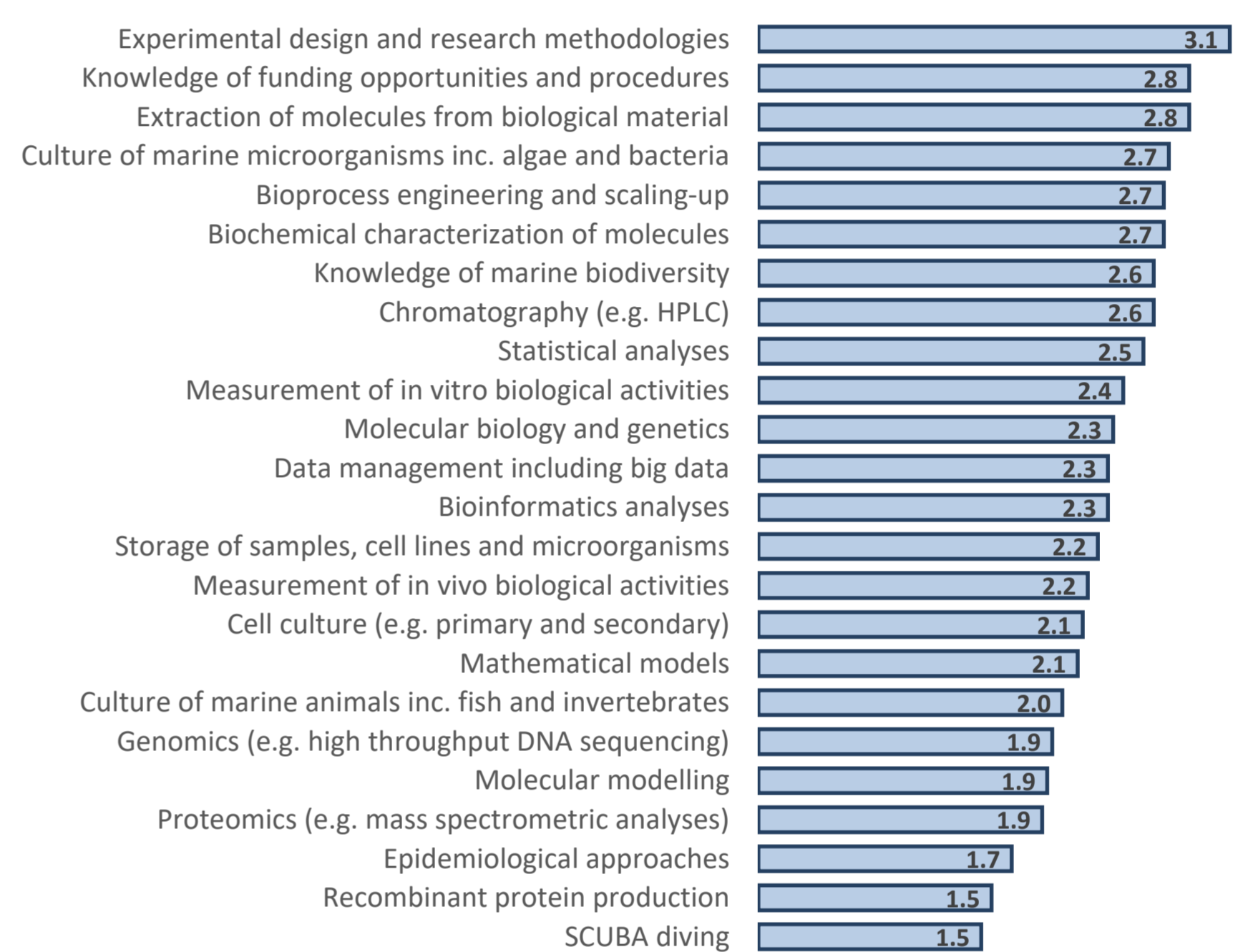
General Skills
(1-Not needed ; 2-Desirable ; 3-Highly desirable ; 4-Essential)



Method

An online *Google* survey form was designed and distributed by email to relevant personnel in blue biotechnology and aquaculture enterprises across Europe (available at <https://bit.ly/2HvqOn0>) from March 2017; moreover, hardcopies of the form were given to participants at various relevant conferences and meetings. Participants were asked to complete the form as if they were intending to recruit a newly qualified technical member of staff with masters-level training. In the first section, data were collected for the name, location, number of employees and main focus of each company (e.g., food, energy, human health and wellbeing, environment, life science products, aquaculture). In the second section, participants ranked five broad skills and attributes for relative importance (least to most important). In the final section, participants provided an opinion for how important each of a series of 'general' and 'scientific' (or technical) skills and attributes was on a scale from 'Not needed' to 'Essential'. A free text box allowed participants to state other skills or attributes they felt would be important.

Scientific Skills
(1-Not needed ; 2-Desirable ; 3-Highly desirable ; 4-Essential)



With respect to 'scientific' and 'technical' skills and attributes, employers valued highly experimental design and research methodologies, knowledge of funding opportunities, and knowledge and skills associated with extracting molecules from biological material. The 'importance' scores indicated that the 'general' skills were valued more highly than the 'scientific' or technical skills set.

Calling all blue biotechnology employers...

Are you interested in hosting a Masters-level intern for 6 months from January 2019? If so, we would love to hear from you now! Simply contact us at the address above.

Our programme continues to evolve to meet employer needs, so please help us by taking our survey at <https://bit.ly/2HvqOn0> or by scanning this QR code



Discussion

Blue biotechnology and aquaculture require educational programmes that deliver the skills needed by workers or those entering these sectors, but few recent studies have assessed the skills requirements in the blue economy. An employer survey was performed and used to inform the structure and content of an *Applied Blue Biotechnology Masters II* programme at the University of La Rochelle.

The survey revealed that 'general' skills were valued more highly than 'scientific' or technical skills, in particular the ability to acquire new skills, knowledge and techniques. Many of the skills valued most highly by employers can be acquired through work experience and this is an effective way to develop such skills [2]. Therefore, the Masters II programme incorporates a 6-month work placement after 4-months of acquiring scientific skills and knowledge in formal classes.

The skills survey continues to accept submissions and these will be used to further refine the Masters II programme to ensure it meets the needs of employers in the blue economy. The present study highlights the skills needs of employers of Masters-level graduates in the blue biotechnology sector.

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The Applied Blue Biotechnology Master II

The first *Applied Blue Biotechnology Master II* students enrolled at the University of La Rochelle in September 2017. The programme prepares students for a career in blue biotechnology by developing skills and knowledge applicable to health, nutrition and aquaculture sectors, and it is delivered by a team of academics from the University of La Rochelle, Universidad Católica de Valencia, University of Stirling and CIIMAR, and industrialists from blue biotechnology companies.

The programme consists 4 months of teaching (September to December) to acquire scientific and technical skills and knowledge, followed by a 6-month work placement where students acquire and develop generic skills key for employment. To apply to study on the programme or for further information on the project please visit www.bbmbc.eu or follow us @BlueBiotech