

AN INITIAL SWOT AUDIT OF THE MEDICAL PHYSICS PROFESSION IN MALTA: THE PERSPECTIVE OF MEDICAL PHYSICISTS

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Abstract— In Malta, medical physics is a relatively new profession and thus far there has not yet been a formal situational analysis to determine how the profession is progressing. A SWOT audit of the profession in Malta was therefore deemed necessary so that a strategic plan may be developed. The specific objectives of the study were: (a) to develop a vision statement for the medical physics profession in Malta, (b) to analyse the current state of the profession in Malta by carrying out a SWOT thematic analysis with respect to the desired vision statement as perceived by the local Medical Physics professionals, and (c) to develop an initial set of strategic objectives for the profession in Malta. Data for the vision statement was collected via document analysis whilst SWOT data were collected using a structured online anonymous questionnaire distributed to all the medical physics professionals. The study has provided a comprehensive analysis of the profession, its strengths and weaknesses, ways in which the profession can grow by making good use of the available opportunities, and also highlighting the external threats facing the profession. A list of strategic objectives was developed. It is the hope of the authors that this study will encourage other medical physics national organisations in other countries to carry out similar studies.

Keywords— **Medical physics profession, medical physicists, SWOT analysis, vision statement.**

Nomenclature

MP Medical Physics

MPE Medical Physics Expert

MPP Medical Physics Professional (Medical Physicist or Medical Physics Expert)

RPC Commission for Protection against Ionising and Non-Ionising Radiation (Malta)

CPCM Council of Professions Complementary to Medicine

I. INTRODUCTION

Medical Physics (MP) is a relatively new profession in Malta. Although discussions on its development and recognition began in 2007, it was not until 2012 that the Ministry of Health acknowledged the relevance of MP. A grant from the European Social Fund was awarded to help fund the first cohorts as a result of a strong partnership between the Ministry of Health and the University of Malta's MP department [1]. MP was classified as a regulated profession by the Maltese government in 2014 [2]. At present, Malta has 20 clinically qualified medical physics professionals (MPPs) who work within Diagnostic and Interventional Radiology (D&IR), Radiation Therapy (RT) and Nuclear Medicine (NM) [1] [2]. The Malta Association

of Medical Physics (MAMP) is the officially recognised professional organization for MPPs in Malta and holds meetings and seminars to encourage members to participate in the Association's and EFOMP's activities. The M.Sc. in Medical Physics and B.Sc. in Physics, Medical Physics and Radiation Protection were established in Malta to ensure a steady number of potential entrants to the profession. Today MPPs in Malta contribute significantly to healthcare, particularly in the use and safety of ionising and non-ionising radiation. MPPs work in hospitals or as consultants to hospitals, the administrative sector and academia [3].

Since there had not yet ever been a formal situational analysis of the profession it was decided to carry out a SWOT audit so that the state of the profession may be assessed. This would help make possible the increased development of the MP profession in Malta. SWOT-based strategic planning is used widely in healthcare, including for MP [4-9].

The objectives of the study were to: (a) develop a vision statement for the profession, (b) conduct a SWOT analysis of the present state of the MP profession in Malta with respect to the vision statement as perceived by the MPPs, and (c) develop a research-based list of strategic objectives for the profession and for the identification of potential actions to be taken. The research study provided the MPPs involved with the opportunity to reflect on a desired enhanced future vision for the profession in Malta.

II. MATERIALS AND METHODS

We live in a globalised world and Malta is part of Europe. Therefore, the creation of the vision statement for the MP profession in Malta was carried out via a document analysis of relevant European and international legislation and documentation [3], [10-19]. To develop the vision statement a search for the following terms was carried out within the documentation: vision, future, competences, key activities. A vision statement was then formulated which reflected the desired future mission for MPPs. In practice, the resulting vision statement was very close to one which was being concurrently developed by EFOMP. The SWOT themes were identified via an anonymous quantitative survey among MPPs in Malta. The survey questionnaire consisted mostly of possible SWOT thematic statements derived from the vision statement to each of which was attached a standard level of agreement/disagreement Likert scale. A mean level of agreement/disagreement score was achieved by assigning values +2.0 = 'Strongly Agree', +1.0 = 'Agree', 0.0 = 'Not Sure', -1.0 = 'Disagree', -2.0 = 'Strongly Disagree' to the

Likert scale. A value between +0.5 and +2.0 indicated agreement with the statement with a value above +1.0 indicating strong agreement. Corresponding negative values indicated disagreement and strong disagreement whilst a value in the range $-0.5 < \text{Mean} < +0.5$ indicated a more neutral, indecisive, or ambiguous stance.

Some additional thematic statements suggested by the participants themselves (indicated by *), were included in the results. Some questions (indicated by **), probed the current scope of the role at several stages of the medical device cycle and had the following response alternatives (participants could choose more than one alternative):

- a. ionising radiation based medical devices,
- b. non-ionising radiation based medical devices,
- c. all medical devices,
- d. no medical devices.

Some other questions required a simple yes/no answer (indicated by ***).

The quantitative data from the questionnaire were analysed using descriptive statistics. The survey was held online via a Google form and kept anonymous so that all MPPs in Malta could participate at a time of their convenience. The response rate was 40% ($n = 8$). A copy of the questionnaire is available via the first author.

III. RESULTS AND DISCUSSION

This section first provides the proposed vision statement for the MP profession in Malta. The SWOT data obtained from the survey is then presented and discussed. The section ends by suggesting a list of strategic objectives for achieving the proposed vision.

3.1 Vision statement

Given the present work done by the EFOMP Professional Matters committee on the future envisaged role of MPPs, it was decided to adopt the version of the vision statement suggested by the committee at the time when the questionnaire was being finalised [20]. The proposed vision statement is as follows:

“The Medical Physics profession will be recognised by all healthcare stakeholders as contributing to maintaining and improving the quality, safety and cost-effectiveness of healthcare services through patient-oriented activities requiring expert action, involvement or advice regarding the specification, selection, acceptance testing, commissioning, quality assurance, decommissioning and optimized clinical use of present and future medical devices and regarding patient risks from all associated physical agents including protection from such physical agents, installation design and surveillance, and the prevention of unintended or accidental exposures to physical agents; all activities will be based on current best evidence or own scientific research when the available evidence is not

sufficient. The scope includes risks to volunteers in biomedical research and carers and comforters.”

“In addition, Medical Physics Professionals should also take on at the expert level the added function of the protection of workers and the general public from physical agents (such as Radiation Protection Expert, Magnetic Resonance Safety Expert and Laser Safety Expert).”
(Caruana, C. J., personal communication, 22 March 2022)

3.2 STRENGTHS (S) of the MP profession

The main strengths of the profession identified via the survey were:

*S1. Most MPPs are certified by the Commission for the Protection against Ionising and Non-Ionising Radiation (RPC) as Medical Physics Experts (MPEs) and Radiation Protection Experts (RPEs) (***)*

Having a high percentage of MPPs certified as MPEs (100%) and RPEs (75%) is a strength of the profession.

S2. MPPs recognised by stakeholders as a contributor to healthcare (+0.75)

MPPs agree with this statement which is a strength with respect to the vision statement. However, the score indicates that more attention must be given to promotion of the profession and increase its visibility among stakeholders.

S3. High knowledge and skills in specialty areas (+1.50)

MPPs strongly agree that they are well informed of the procedures and techniques in their corresponding specialty area. This can be considered as a core competence with respect to the vision statement.

S4. MPPs provide education to students ()*

According to the responsibilities of a MPP as specified by IAEA and the European Commission, MPPs should contribute to the education of MP and other healthcare students and staff. The great majority of MPPs contribute actively to the education of students and are recognised as experts in MP by the University of Malta [10], [17].

S5. MPPs have sufficient scientific expertise regarding medical devices used in their specialty area and their clinical use (+1.25)

MPPs strongly agree with this statement. MP is the only profession in healthcare with a strong understanding of the technology and means of optimisation of protocols.

S6. MPPs have deep techno-scientific expertise for safeguarding patients, workers, and the public from ionising radiation and other physical agents employed in their field (+1.25)

MPPs in Malta consider that they are highly capable of handling such agents which is a strength with respect to the vision statement. Physical agents provide considerable medical benefits, and their usage is steadily rising. However,

there is a risk component as well, and when employed by individuals who lack appropriate understanding they constitute a source of unnecessary patient, occupational and public risk.

S7. MPPs have strong analytical, problem-solving, and trouble-shooting skills (+1.25)

MP services require strong problem-solving skills. MPPs in Malta all possess a first degree with a strong physics and mathematics component that guarantees that only those possessing high analytical skills enter the profession.

S8. MPPs have strong mathematical, statistical, and data analysis skills (+1.13)

MPPs lead over all other healthcare professions in terms of quantitative data analysis, statistics, and mathematics. Quantitative imaging, artificial intelligence (AI), and machine learning are seeing a surge in both diagnostic and therapeutic applications, opening yet another higher tier dimension. The Master's in medical physics programme at the University of Malta includes a strong machine learning and pattern recognition component as well as advanced signal and image processing skills for physiological measurement and medical imaging.

S9. Strong legal foundation for the profession (+0.75)

The Maltese Parliament transposed EU directive 2013/59/EURATOM as the Basic Safety Standard Subsidiary Legislation (SL) 585.01, stating MPEs are qualified to provide specialist advice on radiation physics related matters [11, 12]. The MP profession is also a legally established health care profession regulated via the Council of Professions Complementary to Medicine (CPCM) [2]. Having the profession legally recognised by the local authorities is a critical strength with respect to the vision statement.

S10. MPPs have strong scientific research skills (+1.25)

MPPs have unmatched quantitative scientific research abilities that have been perfected through many years of undergraduate and postgraduate training. MPPs are strong in concepts of accuracy, reliability, and estimations of uncertainty. Since MPPs often introduce new technologies in healthcare and since often manufacturer provided protocols are not sufficiently optimised to the local population or to every clinical indication, they need to have research skills to drive the optimised use of the technology forward. This is in consonance with the part of the vision statement stating that “*all activities will be based on current best evidence or own scientific research when the available evidence is not sufficient*”, this is a critical strength.

S11. MPPs have strong ICT skills (+1.00)

MPPs in Malta possess high ICT skill levels, including programming and this is a strength with respect to the vision statement. MAMP organises a highly sought course on data analysis in Python specifically for MPPs annually and attended by many physicists from around the world [21, 22].

S12. MP services in Malta compare well with other EU countries (+0.50)

The MPPs agree, though not strongly, that services offered locally are comparable to those in other EU countries.

*S13. High level qualification and curriculum framework leading to the certification of a MPP (***)*

The majority of the MPPs agree with this statement (62.5%). However, those that did not necessarily agree (32.5%) have mentioned that the curriculum could be improved by having part of the clinical training carried out at hospitals in other EU countries to widen the expertise and vision to other specialties of MP not presently available.

S14. Young team that is able to adapt and with a motivational drive for improvement ()*

The MPPs identified the determination, competitive attitude and drive for improvement within the profession as being one of its critical strengths. MPPs constitute a young team with progressive ideas. One of the respondents identified that Malta as a small country made it easier for the profession to adapt to new changes: “*Since we are a small country, we can be highly cohesive and adaptable. For example, in larger countries things are often a bit fragmented because of the many variations in local procedures within the same country, and professionals would be hesitant to comment or commit without approval from all.*”

S15. MPPs take part in regional/international networking (+0.50)

Regional and international networking will improve the perception of the profession and strengthen its professional and political position. However, the mean Likert score indicates that this strength needs to be developed further.

S16. Introduction of the Bachelor's degree in Physics, Medical Physics and Radiation allows for the profession to grow (+0.75)

The introduction of the Bachelor programme has boosted the number of young people entering the profession. With more members, the MP profession in Malta will be able to be more involved in the clinical use of present and future medical devices and physical agents which is a strength with respect to the vision.

3.3 WEAKNESSES (W) of the MP profession

The main weaknesses of the profession identified via the survey were:

*W1. No MPPs certified as a Magnetic Resonance Safety Expert (MRSE) or Laser Safety Expert (LSE) (***)*

With regard to the vision statement this can be seen as a weakness since none of the MPPs in Malta are recognised as a MR Safety Expert nor as a Laser Safety Expert. This is indeed a pity as courses for certification in these areas are easily available internationally. No such recognitions are

legally required in Malta, which is a lacuna that needs to be addressed. However, MPPs should acquire the necessary qualifications so that they will be ready when the opportunity presents itself.

W2. Shortage of material resources (0.0)

The results were neutral, which means that a significant number of MPPs may be deprived of the resources necessary for them to deliver effective and safe service. This can be considered as a weakness of the profession as it makes it more difficult to achieve the objectives stated in the vision statement.

*W3. MPPs are mainly involved in the specification and procurement of ionising and non-ionising radiation based medical devices rather than all medical devices (**)*

The MP profession in Malta is young, and its position at the moment is weak concerning the vision statement that emphasizes the involvement of MPPs in the specification and procurement of *all* medical devices. The profession needs to broaden its scope of practice beyond radiation-based devices, as suggested by the vision statement. The involvement of MPPs in the procurement and specification of non-ionising radiation devices is higher for D&IR (100%) compared to RT (66.7%) and NM (50%). D&IR MPPs are giving increased attention to the quality control of ultrasound (US) and magnetic resonance imaging (MRI), which may explain this difference. However, the introduction of MR-LINAC at the main oncology centre in Malta would likely encourage RT MPPs to become more involved in non-ionising radiation devices. Two RT MPPs believe that MPPs are involved in procuring all medical devices – this is probably because they help procure various ancillary medical devices such as applicators, moulds, and patient restraint devices. It has however been advised that to move this issue forward the University of Malta will be introducing Physiological Measurement in its revised M.Sc. Medical Physics curriculum for October 2023 (Caruana, C.J., personal communication, 5 September 2022).

*W4. MPPs in Malta are involved in the acceptance testing of ionising and non-ionising radiation based medical devices, but this is not entrenched in law and not to all medical devices (**)*

Overall, the perception is that MPPs in Malta are involved in the acceptance testing of ionising and non-ionising radiation based medical devices but very little outside these two categories. Hence with respect to the vision statement which states that MPPs should endeavour to involve themselves in the acceptance testing of *all* medical devices, the position of the profession is still weak. The profession should strive to extend acceptance testing to all medical devices to make sure that device performance adheres to the desired specifications [23]. It should be noted however that currently there are no non-ionising radiation based medical devices in NM, whilst the MR-LINAC in RT should be introduced at the last quarter of 2023.

*W5. MPPs in Malta are involved in commissioning, but this is not entrenched in law, and not to all medical devices (**)*
Again, the perception is that MPPs in Malta are involved in the commissioning of ionising and non-ionising radiation based medical devices only. Hence with respect to the vision statement, the MPPs should endeavour to involve themselves in the commissioning of *all* medical devices. All the participants in the study indicated that MPPs in each respective specialty area perceive that MPPs in Malta are involved in the commissioning of ionising radiation based medical devices. On the other hand, there are larger percentages of MPPs from RT and D&IR (66.7% and 100% respectively) than MPPs from NM (50%) who perceive that MPPs are involved in the commissioning of non-ionising radiation based medical devices. This can be explained by the fact that there are no non-ionising devices yet in NM, unlike D&IR.

*W6. MPPs in Malta are mostly involved in the quality assurance (QA) of ionising and non-ionising radiation based medical devices and not all medical devices (**)*

With respect to the vision statement, which states that MPPs should endeavour to involve themselves in the QA of *all* medical devices, the position of the profession is still weak. 87.5% are involved in the QA of ionising radiation based medical devices, whilst 62.5% and 12.5% perceive that MPPs in Malta are involved in the QA of non-ionising radiation based medical devices and all medical devices respectively.

*W7. MPPs in Malta are little involved in the decommissioning process of medical devices (**)*

Only 50% of MPPs in Malta are involved in the decommissioning process with regards to ionising radiation based medical devices, with 37.5% not performing this duty on any medical device. It could be that MPPs are not performing this duty due to other pressing work. Therefore, the involvement of MPPs in the decommissioning process of all medical devices, as stated in the vision statement, is weak. MPs should strive to be part of the decommissioning process of all medical devices. However, it should also be mentioned that very few machines were decommissioned over the past years. Traditionally medical radiological devices in Malta have a life span of more than 10 years.

*W8. MPPs are mostly involved in optimising the clinical use of ionising and non-ionising radiation based medical devices only (**)*

Concerning the vision statement that states MPPs should be involved in optimising the clinical use of *all* medical devices, the position of the profession is still weak. With 87.5%, 62.5%, and 12.5% indicating that MPPs are involved in optimising the clinical use of ionising based medical devices, non-ionising based medical devices, and all medical devices respectively.

*W9. MPPs are able to provide advice regarding patient risks and protection from ionising and non-ionising radiation but not from all physical agents (**)*

100% of MPPs provide advice in cases of ionising radiation and 50% provide advice in cases of non-ionising radiation. None of the participants provide advice regarding patient risks and protection from all physical agents. This shows that the general notion of physical agents is not well established but just ionising and non-ionising radiation devices and in the case of the latter this is limited to only US and MRI – but not lasers, ultraviolet, infra-red, visible.

*W10. MPPs are involved in the installation and surveillance of radiation devices but not all medical devices (**)*

All the participants stated that they are involved in the installation and surveillance of ionising radiation based medical devices, 62.5% are involved in the installation and surveillance of non-ionising based medical devices, and none are involved for all medical devices.

W11. Lack of a universally acknowledged easy to promote mission statement for the profession (+0.38)

One of the issues that the profession is facing is the lack of a mission statement that is unambiguous, universally recognised, and easily marketable. The implementation of a mission statement shows the importance of the MPPs role to the healthcare management and society at large. This cannot be achieved without a well-publicised mission statement.

W12. Narrow range of specialties (-0.38)

The use of ionising radiation in D&IR, RT, and NM remains the primary clinical MPP role in Malta. The focus of the profession should be broadened to include all physical agents and all medical devices as indicated by the vision statement.

W13. Insufficient robust leadership and strategic skills (-0.13)

Strategic leadership is important as it is critical to the achievement of the desired vision. Perhaps there needs to be a debate on the development of strategic leadership for the profession in Malta. Members of the profession should attend leadership conferences/webinars/courses.

W14. Low marketing skills (+0.25)

The mean Likert score suggests that MPPs struggle with such skills. This is a weakness in the profession's ability to make itself more recognised by stakeholders as a critical profession with respect to the quality, safety, and cost-effectiveness of healthcare services. However, one respondent noted that efforts are being made to address this issue by actively engaging with other healthcare professions.

W15. Some MPPs are reluctant to be part of the wider healthcare picture (0.0)

The respondents are unsure whether their peers are reluctant to be part of the wider healthcare picture. Some MPPs may

prioritise physics but inter-professional teamwork and cooperation are also important.

W16. Some MPPs have insufficient communication and pedagogical skills (-0.25)

MPPs should develop their communication skills, as this would help the profession market its services and its vision to other professions and management.

W17. Low level of research including research on professional and educational issues (+0.75)

Research has barely taken off in Malta due to either other work/personal commitments or else lack of motivation. This is considered as a weakness with respect to the vision statement.

W18. Low number of MPPs (+0.63)

The MPPs stated that their work duties can at times be overwhelming and it can be challenging to enrol in new training courses to further increase their knowledge and skills in the profession. By employing more MPPs this weakness can be minimised. One of the respondents stated: "We are essentially a start-up operating within a larger government organisation. There is foundational work to be completed and more staff to be recruited before we can reach a steady working state to be able to take on higher level duties."

3.4 OPPORTUNITIES (O) for the MP profession

The main opportunities available to the profession identified via the survey were:

O1. Increase in number of hospital medical devices (+1.13)

MPPs should take advantage of the ever-increasing range and sophistication of medical devices. MPPs have more competence in this field than other healthcare professions, and that there is an opportunity for MPPs to lead in the use of advances in AI, theranostics, lasers, biomedical optics, and nanotechnology. A MPP stated: "If we are proactive, we can be at the forefront for adoption of these technologies."

O2. Link up with patient organisations and act as patient advocates regarding safety standards in healthcare (+0.25)

MPPs are not sure whether they can work towards this. This could be due to their overwhelming range of duties and low numbers; the time may simply not be available.

O3. Link up with occupational health and safety organisations and environmental groups and project themselves as occupational/public advocates with regard to safety from physical agents (+0.13)

This is a great opportunity for MPPs that are interested in expanding their role given the ever-increasing emphasis on occupational safety and environmental issues in society at large. It is also an opportunity for greater public outreach by the profession.

O4. Exerting pressure on legislators to recognise that patient safety is not limited to ionising radiation (+1.25)

Legislation regarding physical agents other than ionizing radiation would further increase the opportunities for the profession. For instance, the EU has implemented laws for staff safety related to electromagnetic radiation, but there is no strong legislation for patient protection as there is for ionising radiation. This is an opportunity for MPPs to raise awareness of these challenges among the broader public, pushing the field into the public eye and increasing its visibility.

O5. Raise profile with health economists (+1.00)

Health economics, which is the practise of utilising limited resources in the best way, is very important as healthcare costs are on the rise as are patient expectations. This is an opportunity for MPPs to be involved in clinical trials and health technology assessment. One respondent noted: "Involvement in clinical patient pathways to ensure that introduction and use of new medical devices is really justified."

O6. Self-testing and wearable devices can be turned into a business opportunity (+0.50)

Medical devices are being designed for home use that can collect health data. According to the vision statement this could be an opportunity for the MPPs to provide quality control services and proper guidance on the selection and use of such devices.

O7. Research grants from the Government of Malta (0.0)

The responses were neutral. This could be since very few to none are actively involved in research as dedicated time is simply not available.

O8. Involvement in IPEM/EFOMP/IAEA courses and conferences (+0.38/+1.13/+1.50)

The majority of MPPs take part in such courses. The courses offered by these organisations present a valuable opportunity for the continual professional development of MPPs in Malta.

3.5 THREATS (T) to the MP profession

The main threats to the profession identified via the survey were:

T1. Low number of MPPs (+1.0)

A lack of MPPs is a threat as it would not allow the profession to achieve what is being proposed by the vision statement. In the last few years, the number of physics and engineering graduates have decreased dramatically. However, this threat has been averted with the introduction of the Bachelors in Physics, Medical Physics and Radiation Protection at the University of Malta which has led to a dramatic increase in the number of students taking up MP studies. One expects this solution to bear fruit in October 2023, when the first cohort following the new Bachelors will be in a position to

start their Master's in medical physics which will lead to new candidates seeking clinical certification as MPPs.

T2. Austerity economics (+0.75)

Austerity measures could result in a low yearly intake of MPPs, causing a threat to the profession's growth as workload increases but staffing levels do not. However, the political leadership of the profession is taking proactive steps to counter the threat of commoditisation.

T3. Role poaching from other professions (+0.50)

Role-poaching can be harmful to the profession and inter-professional relations. A MPP even stated that some MPPs themselves could be contributing to this when they do not strive to deliver high level competences: "MPPs only performing routine constancy testing may give the impression that their job can be done by other healthcare professionals or technicians."

T4. The profession is facing unfair competition from other professions (+0.38)

According to some MPPs, technicians or other healthcare professionals have been performing some work that is typically done by MPPs. Involving other professions for daily and weekly QC is a positive development and such professions should be encouraged to do basic checks before using the device with patients. However, it is important that more complex and quantitative tests be done by MPPs and that the daily/weekly tests are overseen by MPPs.

3.6 The way forward: Strategic Objectives

The following strategic objectives were proposed based on the SWOT analysis.

3.6.1 Strengthening of Internal Strengths

1. MPPs should enrol in regional/international approved courses to upgrade their core competences and learn new skills.
2. MPPs should be involved in the education of all healthcare professionals and research on all medical devices and physical agents, not just ionising and non-ionising radiation-based ones.
3. MPPs should exchange experiences between specialty areas to increase the level of cohesion of the profession, with annual written reports on updates and achievements presented at the annual national MP conference, organised by MAMP.
4. The MP profession should expand its role to other specialty areas, such as physiological measurement.

3.6.2 Reducing Internal Weaknesses

1. MPPs should prioritise the core competences outlined in the mission statement and eliminate weaknesses. They should ensure that repeatable tasks like daily constancy testing are delegated to other professions and focus on higher order competences like advanced quantitative QC, optimisation and upcoming technologies. This will

- make it more challenging for MPPs to be replaced and ensures the growth of the profession.
2. Attend courses for magnetic resonance safety expert and laser safety expert. Several organisations offer these courses even remotely.
 3. MPPs need to improve their strategic planning, advertising, and public relations skills to succeed in the modern world. They should become active participants in the larger society and acquire skills from other fields like management, strategic planning, business, and economics. MAMP should organise specific courses on these subjects and provide materials to assist MPPs in pitching their expertise to stakeholders.
 4. The MP profession should adopt the vision statement and focus all its strategic planning in this direction.

3.6.3 Grasping Available Opportunities

1. MPP members should leverage their relationships with external organisations to request that education and training in the technical competences necessary for effective and safe use of medical devices be made compulsory through adequate legislation.
2. Attend courses organised by country, regional, or international organisations including those involving new technologies such as machine learning and nanotechnology.
3. Apply for funds such that there is a push in research activities in each specialty area.
4. Link with the RPC such that the profession would have a stronger presence and MPPs can exchange views with the members of the RPC on a regular basis.
5. MAMP should encourage its members to participate in courses offered by the European Network for Training and Education of Medical Physics Experts (EUTEMPE) consortium and EFOMPs European School for Medical Physics Experts (ESMPE), which cover areas such as AI, leadership, radiation protection, and advanced MRI. Participating in these courses can elevate the competences of MPPs in Malta to exceptional levels [24]. The European Nuclear Education Network (ENEN+) consortium presently provides funds for attendance at these courses [25].

3.6.4 Countering External Threats

1. There should be better communication between the CPCM and the Association with regards to the registration of MPPs in Malta. The benchmarking document for medical physics issued by the CPCM should also be amended such that it would strictly follow EU guidelines.
2. Take proactive measures to combat any attempt in introducing the idea that MPPs can be replaced by other members of other professions, which is very hazardous for the MP profession and to patients.
3. Regulations in Malta should be amended such that acceptance testing and commissioning is done by an MPE.

4. Exert pressure on the regulator to ascertain that the MPE is more involved in the work done in the public and private sector.

IV. CONCLUSIONS

The MPPs in Malta provided their perspective on the strengths, weaknesses, opportunities, and threats for their profession. The MPPs highlighted their strong competences in each specialty area, arising from their backgrounds in physics and engineering, which allow them to gain an in-depth understanding of medical devices and their ability to protect patients and the public from ionising radiation and other physical agents. However, they also identified weaknesses in the profession's low level of involvement with non-radiological medical devices, which is a significant drawback in achieving the profession's vision statement.

The questionnaire identified several opportunities for the MPPs to develop the profession further, including attending courses provided by international organisations to improve their competences and further enhance the profession's profile. However, they also acknowledged the threats posed by the lack of new MPPs entering the profession, which may hinder their ability to achieve EU standards. Other threats mentioned were role poaching from other healthcare professionals and austerity economics.

The survey provided a comprehensive overview of the present state of the MP profession in Malta, outlining both its strengths and weaknesses, as well as the opportunities available to it and the threats that it faces. While there are several areas for improvement, the MPPs strong competences and scientific expertise ensure that they are well-positioned to continue providing high-quality care and protection to patients, workers, and the public.

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