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ORIGINAL

Structuring Innovation Activities in Moroccan Public Universities: Proposal of a Procedures Manual

Estructuración de las Actividades de Innovación en las Universidades Públicas Marroquíes: Propuesta de un Manual de Procedimientos

Marzougui Yassine[1], Ilham Taouaf[1], Omar Elyoussoufi Attou[2], Moha Arouch[3]

[1]Faculty of Science and Technology (FST), Laboratory: Engineering, Industrial Management and Innovation, Department of Doctoral Studies in Science and Technology and Medical Sciences. Hassan First University, Settat, Morocco.
[2]National Center for Scientific and Technical Research (CNRST), Department of Doctoral Studies in Science, Affiliated to Engineering, Industrial Management & Innovation Laboratory (IMII), Faculty of Science and Technics (FST), Hassan First University, Settat, Morocco.
[3]Faculty of Science and Technology (FST), Science and Technology Department, Laboratory: Engineering, Industrial Management and Innovation, Hassan First University, Settat, Morocco.

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Corresponding author: Marzougui Yassine

ABSTRACT

In a context marked by the growing need for innovation and knowledge transfer within Moroccan universities, this article presents the development of a procedure manual aimed at guiding and optimizing the functioning of university innovation structures. The primary objective is to support the development of scientific research and innovation within these institutions, in alignment with "PACTE ESRI 2030," a national plan designed to transform the ecosystem of higher education and scientific research in Morocco. The procedures manual developed is the result of an empirical approach based on the practical experience of active participants within various segments of the innovation structures at the studied universities and the outcomes of questionnaires completed by key stakeholders involved in technological monitoring, invention disclosure, the maturation process, and technology transfer. This approach enabled the capitalization of the lived experiences and acquired knowledge of these actors, leading to the creation of a procedural guide that is both pragmatic and tailored to the specific realities of university innovation ecosystems. The aim is to optimize current practices and encourage more efficient and harmonized management of research and technological development activities. This contribution seeks to standardize key processes such as technological monitoring, invention disclosure, maturation procedures, and the stages of technology transfer. The main objective of this manual is to provide a structured and coherent framework for managing innovation activities, promoting modern governance, and ensuring transparent and effective resource management.

Keywords: University Innovation; Intellectual Property; Technological Monitoring; Innovation Governance; Invention; Maturation.

RESUMEN

En un contexto marcado por la creciente necesidad de innovación y transferencia de conocimiento en las universidades marroquíes, este artículo presenta el desarrollo de un manual de procedimientos destinado a guiar y optimizar el funcionamiento de las estructuras de innovación universitaria. El objetivo principal es apoyar el desarrollo de la investigación científica y la innovación dentro de estas instituciones, en alineación con el "PACTE ESRI 2030", un plan nacional diseñado para transformar el ecosistema de la educación superior y la investigación científica en Marruecos. El manual de procedimientos desarrollado es el resultado de un

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enfoque empírico basado en la experiencia práctica de los participantes activos en varios segmentos de las estructuras de innovación en las universidades estudiadas y en los resultados de cuestionarios completados por actores clave involucrados en la vigilancia tecnológica, la declaración de invenciones, el proceso de maduración y la transferencia de tecnología. Este enfoque permitió capitalizar las experiencias vividas y los conocimientos adquiridos por estos actores, lo que condujo a la creación de una guía de procedimientos que es tanto pragmática como adaptada a las realidades específicas de los ecosistemas de innovación universitaria. El objetivo es optimizar las prácticas actuales y fomentar una gestión más eficiente y armonizada de las actividades de investigación y desarrollo tecnológico. Esta contribución busca estandarizar procesos clave como la vigilancia tecnológica, la declaración de invenciones, los procedimientos de maduración y las etapas de transferencia de tecnología. El objetivo principal de este manual es proporcionar un marco estructurado y coherente para la gestión de actividades de innovación, promoviendo una gobernanza moderna y asegurando una gestión transparente y eficaz de los recursos.

Palabras clave: Innovación Universitaria; Propiedad Intelectual; Vigilancia Tecnológica; Gobernanza de la Innovación; Invención; Maduración.

INTRODUCTION

The university innovation structures in Morocco are crucial foundations in the country's educational and economic framework, representing a notable transition towards a knowledge-based and innovation-oriented economy.[1] In addition to fostering significant economic growth through the integration of modern technology and entrepreneurship, these structures serve as dynamic ecosystems for research and development, playing a crucial role in training and developing a new generation of researchers and innovators.[2] The establishment of a vital connection between academics and industry is crucial in promoting the development, marketing, and distribution of groundbreaking technology.[3]

From an educational standpoint, these innovation structures are acknowledged as bastions of excellence where the fields of teaching and research converge, resulting in the creation of both theoretical knowledge and tangible, practical applications. They provide an intellectually engaging and abundantly endowed setting for students and researchers, furnished with advanced laboratories and state-of-the-art research facilities, so preparing a highly proficient workforce capable of fulfilling the requirements of a swiftly changing international economy.[4]

Strategically, these centers play a crucial role in stimulating innovation and fostering the establishment of new businesses, therefore making a substantial impact on Morocco's overall economic progress. Nevertheless, they encounter significant governance obstacles because of the lack of standardized procedural frameworks, which frequently result in inefficiencies and discrepancies in oversight and execution of innovation projects.[5]

Therefore, it is essential to create a thorough procedures manual to enhance the operational efficiency and productivity of these structures, establish standardized best practices, and promote a methodical and sustainable culture of innovation. The objective of this manual is to improve the efficiency and management of university innovation structure's by addressing the existing deficiencies in documentation and standardized procedures. This will provide a valuable resource for administrators, policymakers, and stakeholders, hence contributing to the educational and economic development of Morocco.

Literature review

Establishing a procedures guide is a crucial strategic measure for every organization, with the goal of standardizing and elucidating the many phases of internal operations. The purpose of an efficient operating manual is to provide a comprehensive framework for daily operations, guarantee adherence to regulatory requirements, and facilitate internal communication.[6] The tool is vital for the management of operations, enhancement of results, and mitigation of potential safety risks. The significance of these manuals is evident in many domains, including financial audits and healthcare services, where they significantly contribute to the standardization of processes and protection of assets. The creation of a procedures manual necessitates adherence to many crucial stages and requires a systematic methodology to guarantee its efficacy and pertinence.[7]

The analysis of existing literature on the creation of procedure manuals presents a wide range of methods and optimal strategies specifically designed for various organizational contexts.

Henry and Monkam-Daverat have developed a systematic technique, segmented into clear stages, to direct the creating of a procedure's manual. Their unwavering commitment to a meticulous and systematic approach underscores the significance of this methodology. Firstly, it is crucial to meticulously gather a comprehensive inventory of activities to be documented and to create an ingenious categorization system to guarantee a lucid and cohesive framework for the guide. This stage is exceptionally crucial, as it establishes the fundamental

basis of the project.[8] This process entails precisely establishing the methods to be executed and arranging the data in a lucid and comprehensible way. The subsequent phase of the procedures research entails the collection of comprehensive data through the examination of descriptive landscapes, the conduction of interviews with pertinent stakeholders, and the observation of existing practices. This examination verifies that the documented protocols accurately represent the operating activities of the organization, considering the unique characteristics and demands of each sector examined.[9]

The composition of the manual is consequently dependent on the gathered data, necessitating special focus on the lucidity, brevity, and pertinence of the material included. The language employed should be easily understandable while yet maintaining accuracy, therefore preventing any possibility of confusion or misinterpretation. Ultimately, the process of validating written papers is an essential measure to confirm the precision and dependability of the documented methods. The process of validation entails rigorous evaluations, perhaps using the expertise of professionals, and may encompass real experiments to detect any possible deficiencies. Hence, this systematic approach guarantees both the excellence of the manual and its appropriateness for the particular practices and demands of the setting in which it will be implemented, especially pertinent for intricate settings like Moroccan public institutions.[9]

In order to design and validate procedural papers, Ana Fernández-Laviada proposes a collaborative method between operational services and internal audit. In her view, this partnership is crucial for accurately detecting the inherent risks in operational processes and for implementing pertinent internal control measures. Through collaboration, these two entities can guarantee that the established procedures are both resilient and flexible enough to accommodate the everyday challenges of the company.[10] Implementing this strategy not only enhances the effectiveness of internal controls but also reinforces adherence to existing norms and regulations, while guaranteeing a deeper comprehension of risks by operational stakeholders.[11]

Concerning the validation of documents, Fernández-Laviada suggests a two-step procedure. The initial stage entails a validation process conducted by the direct users of the procedures, who possess the most pertinent knowledge to detect any discrepancies or errors. This process of user validation enables the papers to be refined prior to their widespread implementation. The second phase involves a thorough evaluation, which seeks to guarantee the overall consistency of the system.[10] This concluding assessment guarantees that the processes are properly synchronized with the strategic goals of the firm and that they efficiently enhance risk management. Implementing this approach enables firms to not only boost the dependability of their procedural papers but also optimize the overall efficiency of their internal control system.[12]

In their seminal study on business process reengineering (BPR), Michael Hammer and James Champy emphasized the need of precisely defining processes in order to improve the effectiveness and competitiveness of organizations. The authors argue that the documentation of procedures is crucial in order to guarantee a comprehensive understanding and uniform execution of processes across the entire business. This entails the identification of essential processes, analysis of crucial stages, and establishment of standardized best practices. Their methodology is on the profound metamorphosis of processes, rather than merely their incremental enhancement, underscoring the development of manuals that not only delineate existing procedures but also enable innovation and integration with forthcoming changes.[13]

In order to create a successful procedures manual, it is essential to use a systematic approach that includes the involvement of fundamental stakeholders at each phase of the process.[14] The multi-phase strategy proposed by Hammer and Champy involves a comprehensive examination of current processes, followed by the development of a new operational framework, and ultimately, the execution of this framework through the creation of a full procedure's manual. In addition to providing clear and exact instructions for each activity, the manual should also include performance indicators to assess the efficiency of the reengineered operations. Through the use of Business Process Reengineering (BPR) concepts, businesses may guarantee that their process manuals are not merely fixed texts, but rather adaptable instruments that facilitate ongoing enhancement and organizational expansion.[13]

Koumetio Mireille and Mekam Grange highlight the essential significance of the procedure's manual in operations management, which is especially relevant in the hospital setting where accuracy and uniformity of procedures are vital. The authors stress the importance of the procedures manual in establishing standardized processes, therefore guaranteeing that operational practices are uniform and in accordance with regulatory obligations. The standardization is especially crucial in the hospital industry, as any departures from established protocols can result in significant repercussions for the quality of treatment and the safety of patients. Moreover, they stress that the procedures manual enhances the safeguarding of the institution's assets by offering explicit instructions for the administration of material and human resources.[15]

In their study, Koumetio Mireille and Mekam Grange employ an action research technique, which is a methodology that integrates investigation with the execution of real solutions, to examine the operations of hospitals and provide interventions for improvement. This methodology enables the assessment of current procedures and the detection of deficiencies with respect to global accreditation criteria. Drawing from this study, the authors can suggest modifications that not only enhance operational efficiency but also synchronize

the institution's procedures with global norms, therefore bolstering its capacity to get and sustain the required accreditations. In highly regulated settings like hospitals, this study illustrates that the creation and meticulous execution of a procedures manual are crucial components to guarantee compliance and operational excellence.[15]

Within the realm of accounting audits, ACHOUI and BELABDELLI underscore the paramount significance of process manuals. Indeed, these documents are essential for guaranteeing the transparency of procedures, enabling the transfer of information across the company, and defining the duties of all individuals involved. To obtain a comprehensive grasp of the various procedures, it is strongly advised to use both the narrative description and the flowchart. Certainly, these technologies enable the meticulous documentation of the steps to be executed and the graphical representation of the sequence of operations, therefore promoting a thorough comprehension of the process.[16]

In summary, the assessment of this literature review indicates that the development of a procedure's manual necessitates a meticulous methodology, efficient collaboration among the different parties involved in the firm, and a vital focus on staff training and the adaptation of procedures to suit the particular requirements of the organization. The rigorous and appropriate use of these techniques significantly contributes to the improvement of the effectiveness and relevance of procedural manuals in different organizational settings. Indeed, by adhering to these procedures, it is feasible to guarantee that the procedure guides effectively fulfill the particular requirements of each organizational environment, so maximizing their utility and influence.

METHOD

The methodology employed to create the procedures manual for the innovation structures of Moroccan universities has been meticulously crafted to precisely encompass the many facets and particular difficulties of managing innovation within the university setting. The first stage of our approach entailed a comprehensive identification of the particular requirements of the innovation structure's. This phase encompassed conducting interviews with pertinent stakeholders, such as managers, academic personnel, and students actively engaged in these cities. The aim was to comprehensively elucidate the functioning, difficulties, and particular needs of these organizations. Considering this information, we have established the primary goals of the manual.

The second stage entails creating a questionnaire that is especially designed for each important stage of the innovation process. This questionnaire will be validated through multiple focus group sessions with members of our research team and officials from Hassan 1st University of Settat. The utilization of this interactive method has facilitated the enhancement of the survey instrument to accurately represent the characteristics and requirements of the stakeholders engaged in university innovation.

A comprehensive survey has been created to encompass the whole innovation process, focusing on players engaged in several sectors, ranging from technical surveillance to the further development of ideas, including the disclosure of inventions and the transfer of technology. This integrated methodology enabled a comprehensive data gathering, effectively capturing a comprehensive perspective of the obstacles and particular requirements at every phase of the innovation process. To guarantee a cohesive and thorough understanding of the needs for the development of the procedure's manual, a single questionnaire was used to enable the comparative comparison between the various phases.

Enhancements in participant access and data quality have been achieved by leveraging established professional networks, particularly the PRINTES association (Promotion of Innovation, Transfer, and Exploitation of Knowledge), which enabled the involvement of important stakeholders in the survey procedure. A tailored analysis of the questionnaire responses was carried out, considering the peculiarity of the human-sized samples, which facilitated a thorough and nuanced comprehension of the different dynamics involved.

The choice of participating colleges was determined by a deliberate approach designed to guarantee the highest level of representation and variety among Moroccan universities. The selection of the universities Sidi Mohamed Ben Abdellah in Fès, Mohammed V in Rabat, Chouaib Doukkali in El Jadida, Hassan II in Casablanca, and Hassan I in Settat is based on their substantial participation in innovation activities and their representation of diverse institutional and regional contexts. This selection ensures a comprehensive and global viewpoint on innovation management within Moroccan universities.

The manual's composition was undertaken through a collective effort. In order to guarantee that the manual is both pragmatic and customized to the particular requirements of the innovation structure's, workshops were arranged with end users and managers. The implementation of this collaborative method guaranteed that the manual adheres not only to academic and operational requirements but also to be readily comprehensible and practical for all pertinent users.

Ultimately, the process of validating and evaluating the manual played a crucial role in our methodology. Following the completion of an initial draft, the manual underwent a series of validations by various stakeholder groups in order to guarantee its precision and continued relevance. Structured feedback sessions have been arranged to collect comments and implement required modifications. The continuous assessment phase has been crucial in revising the manual and guaranteeing its compliance with the rigorous criteria necessary for innovation centers in the Moroccan academic setting.

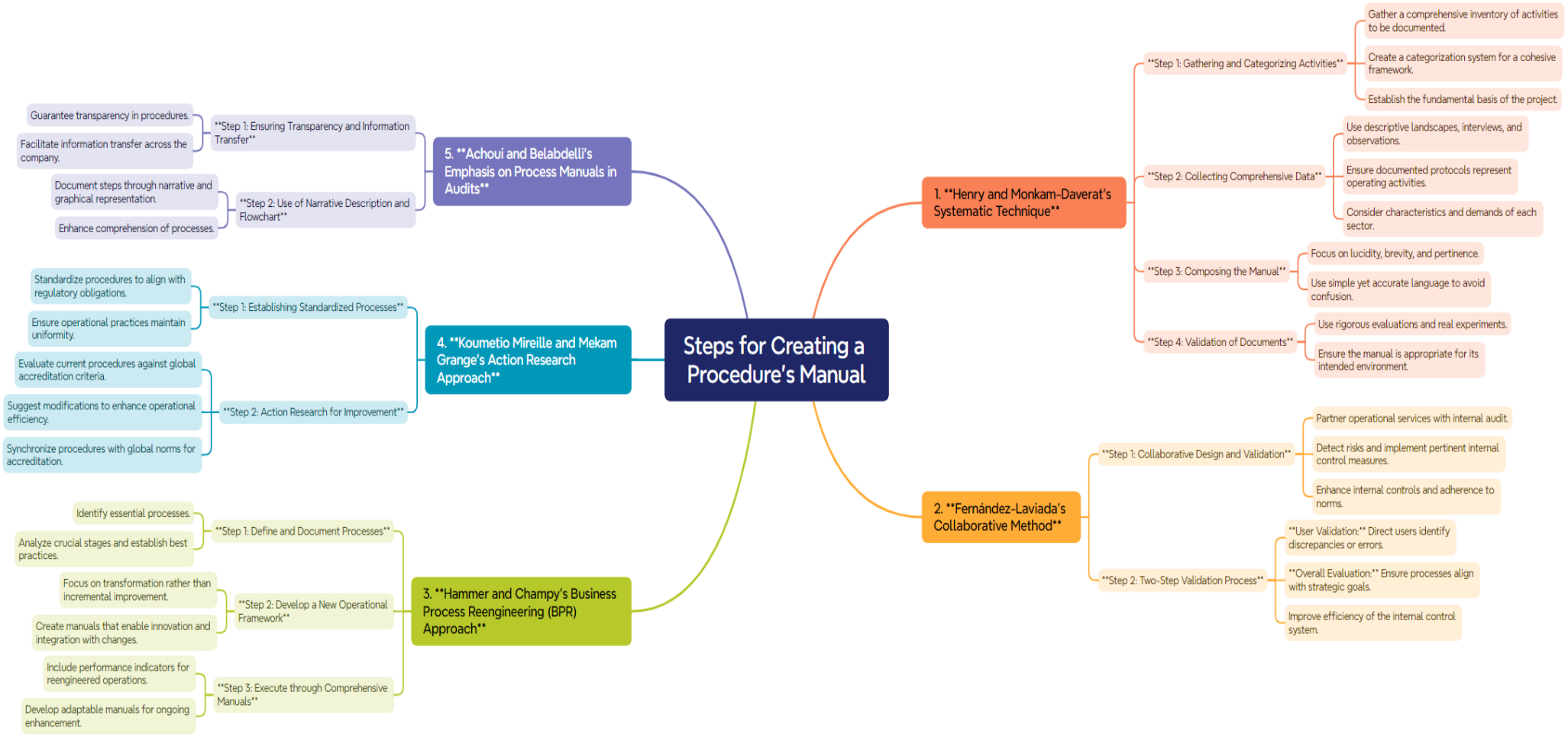

Figure 1. Creating a Procedure's Manual

RESULTS

Questionnaire Results Analysis

In the context of innovation structures within Moroccan public universities, the need to structure and formalize processes through the development of a procedure's manual emerges as a pragmatic response to the multiple challenges identified during the various phases of the innovation process.[17] This approach, based on a thorough analysis of the responses provided by the stakeholders involved in the innovation process, highlights the friction points and specific needs at each stage, from technological monitoring to technology transfer.

Technology Monitoring

Technological monitoring is a central element in innovation management, particularly in the academic context, where the ability to anticipate and integrate technological advancements is crucial.[18] Despite its importance, monitoring practices within Moroccan public universities remain poorly documented.[5] This study aims to fill this gap by analyzing current practices, with a view to developing a standardized procedures manual.

The results indicate that 70 % of respondents use digital information sources as their primary means of monitoring, while 30 % rely on professional and academic networks. The majority of organizations (65 %) do not have formal monitoring procedures, relying instead on individual initiatives or small groups.

Among the main challenges identified, access to specialized databases and the lack of specific training in technological monitoring are the most significant. About 80 % of the participants expressed the need for better integration of monitoring tools into their daily practices.

Respondents emphasized the importance of a procedures manual that would include clear guidelines on selecting information sources, analyzing collected data, and integrating insights into innovation processes. A specific request for regular training on monitoring tools and techniques has also been expressed.

Declaration of Invention

The Declaration of Invention (DI) is a crucial step in the management of innovation within academic institutions, allowing for the protection and commercialization of inventions.[18] However, the DI process can be complex and heterogeneous across different institutions.[19] This work aims to analyze the practices and challenges associated with DI in Moroccan public universities, in order to propose a standardized procedures manual.

The data shows that 60 % of respondents do not follow a formal procedure for the DI, relying mainly on ad hoc approaches. Only 40 % of organizations have written guidelines, but these are often deemed incomplete or unclear.

The main obstacles identified include a lack of specific knowledge about intellectual property rights (75 % of respondents), the absence of clear procedures (65 %), and the need for administrative and legal support (55 %).

Participants expressed a strong need for a procedures manual that would provide clear guidelines, detailed steps for the DI, and information on managing intellectual property rights. It has also been suggested to include document templates and case studies.

The results highlight the heterogeneity and gaps in DI practices within Moroccan public universities. The development of a procedure's manual could standardize and facilitate the IP process, contributing to better protection and enhancement of academic inventions.

Maturation of Innovations

The maturation phase is crucial in the innovation process, allowing for the transformation of an idea or invention into a marketable product or service.[20] In the context of Moroccan public universities, this phase is often managed by dedicated innovation structures.[21] However, few studies have explored the practices and specific challenges at this stage. Our research aims to fill this gap, thereby facilitating the development of a standardized procedures manual.

The results indicate that 55 % of respondents use informal approaches for the maturation of innovations, primarily based on individual experience and informal exchanges with colleagues. Only 30 % of organizations have formal procedures in place.

The most frequently mentioned challenges include the lack of specific funding for maturation (82 % of respondents), insufficient knowledge regarding intellectual property and commercialization (76 %), and the need for better collaboration between researchers and industry stakeholders (69 %).

Technology Transfer

Technology transfer is a fundamental process in the field of innovation, enabling the conversion of academic research into practical applications for the benefit of society.[22] In Moroccan public universities, this process is often managed by dedicated innovation structures. However, the mechanisms and challenges associated with this process remain underexplored in this context. This research aims to fill this gap by analyzing current

practices and identifying the needs for the development of a standardized procedures manual.

The majority of respondents (68 %) indicate that technology transfer procedures are primarily informal and rely on individual initiatives. Only 32 % of participants report the existence of formal procedures within their organization.

The main challenges identified include a lack of awareness and training on the legal and commercial aspects of technology transfer (84 % of respondents), insufficient financial resources to support the process (78 %), and difficulties in negotiating licensing agreements with industrial partners (65 %).

The stakeholders emphasize the importance of having a procedures manual that would provide clear guidelines on the steps for technology transfer, the legal and ethical aspects to consider, as well as advice for negotiating licensing agreements. The request also includes document templates and case studies to guide practitioners.

Proposal of a Procedures Manual

The present manual of procedures for Moroccan university innovation structures aims to enable managers to operate these structures with efficiency and transparency and to generate reliable and accessible information that allows them to:

- Make relevant decisions;
- Manage the intellectual property portfolio;
- Establish a diagnosis of research results;
- Protect research outcomes;
- Develop and commercialize innovative products with high added value in various sectors.

This manual should help to capitalize on and disseminate information about the both internally and externally within the universities. Its purpose is to explain who does what, where, how, and for what end.

This manual must establish a monitoring system that will allow for the university innovation structures oversight of its implementation, the analysis of potential malfunctions, and the collection of relevant observations from the various stakeholders.

Protocol for technology monitoring

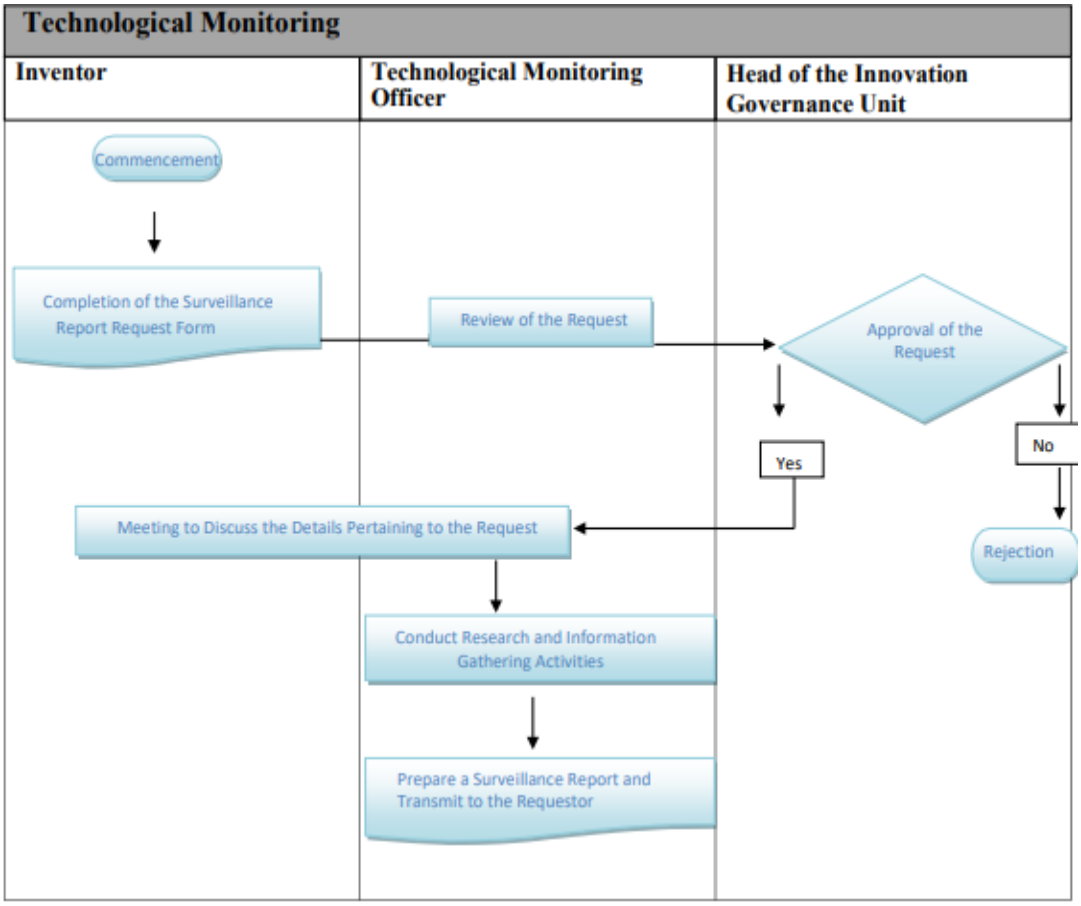

Figure 2. Technology monitoring procedure

Technological monitoring represents an intentional process of information gathering. This process aims to anticipate changes within the socio-economic environment of an entity, with the goal of seizing opportunities. [23] The inventor, at the heart of this process, is actively seeking information on various aspects such as the current state of technology in their field, the analysis of existing patents, the possibility of patenting an invention, the verification of freedom to operate, and the investigation of prior art.[24] To initiate a technology monitroing request, the inventor must provide detailed information through a specific form.

The approval process for this request then begins, involving an evaluation by the patent engineer and technology monitoring (IBVT) and a final approval by the director of the valorization and transfer unit (DCVT). If the request is accepted, a coordination meeting is organized between the inventor and the IBVT to refine the details of the application. This collaborative step ensures that all necessary information is specified and that the monitoring report request form is correctly filled out. Conversely, a rejection decision ends the process at this stage.

Following the approval, the IBVT undertakes in-depth research to gather the necessary information. This meticulous work results in the creation of a technology monitoring report, which is then sent to the inventor. This report plays a crucial role in providing the inventor with a solid foundation to navigate the technological landscape and make informed decisions regarding their inventions.

Protocol for declaring an invention

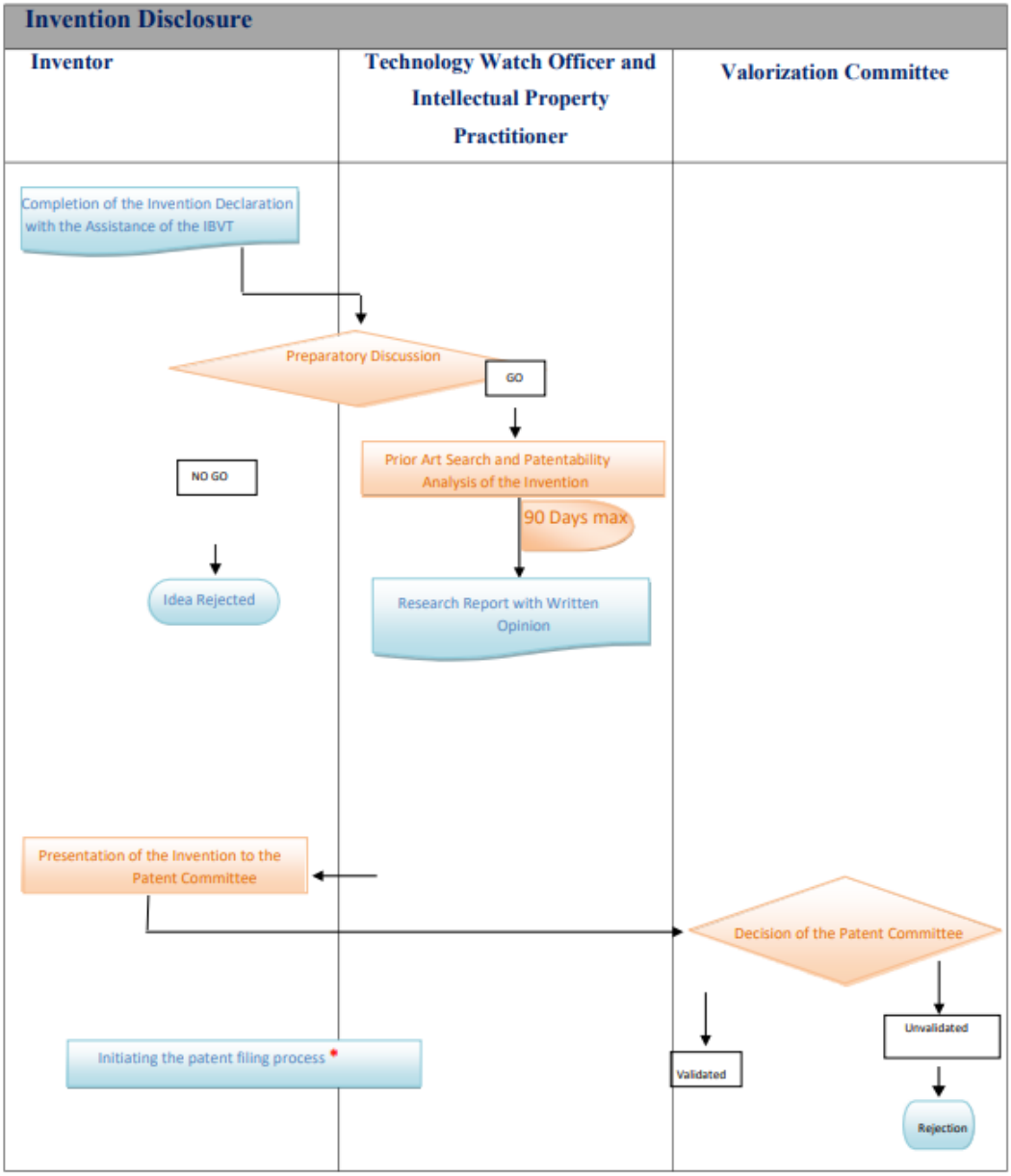

Figure 3. Invention declaration procedure

The declaration of invention as an essential mechanism for inventors eager to protect and enhance their

creations. The invention disclosure form is the first step to officially document an invention within the institution. This approach aims to record the details of the invention and to provide a basis for deciding on the optimal strategy for protection and commercialization, whether that involves obtaining patents, leveraging know-how, or protecting through copyright.[25] It is imperative for any applicant wishing to commercialize an invention or any other product arising from the academic environment to make this declaration. In this document, the inventor details the nature of the invention, identifies the members of the inventing team, and describes the invention while ensuring that it meets the criteria of novelty, utility, and originality.

Following the submission of the declaration, a preparatory discussion is organized between the inventor and the IBVT. This meeting aims to clarify and refine the idea to ensure its patentability. Yes, if at the end of this meeting the invention declaration is deemed invalid (no go), the idea will be rejected. On the other hand, if it is approved (go), the IBVT conducts a prior art search to assess the novelty of the invention.

The next step concerns the assessment of the freedom to exploit the invention. The IBVT conduct thorough research to determine the patentability of the invention, which must be completed within a 90-day timeframe. This research results in the production of a report that includes a written opinion on the feasibility of patenting the invention. The inventor then presents their invention before the valuation committee, which decides on its patentability. If the commission deems the invention patentable, a patent application process is initiated. Otherwise, the proposal is rejected, marking the end of the attempt to promote this invention through this avenue.

Protocol for maturation

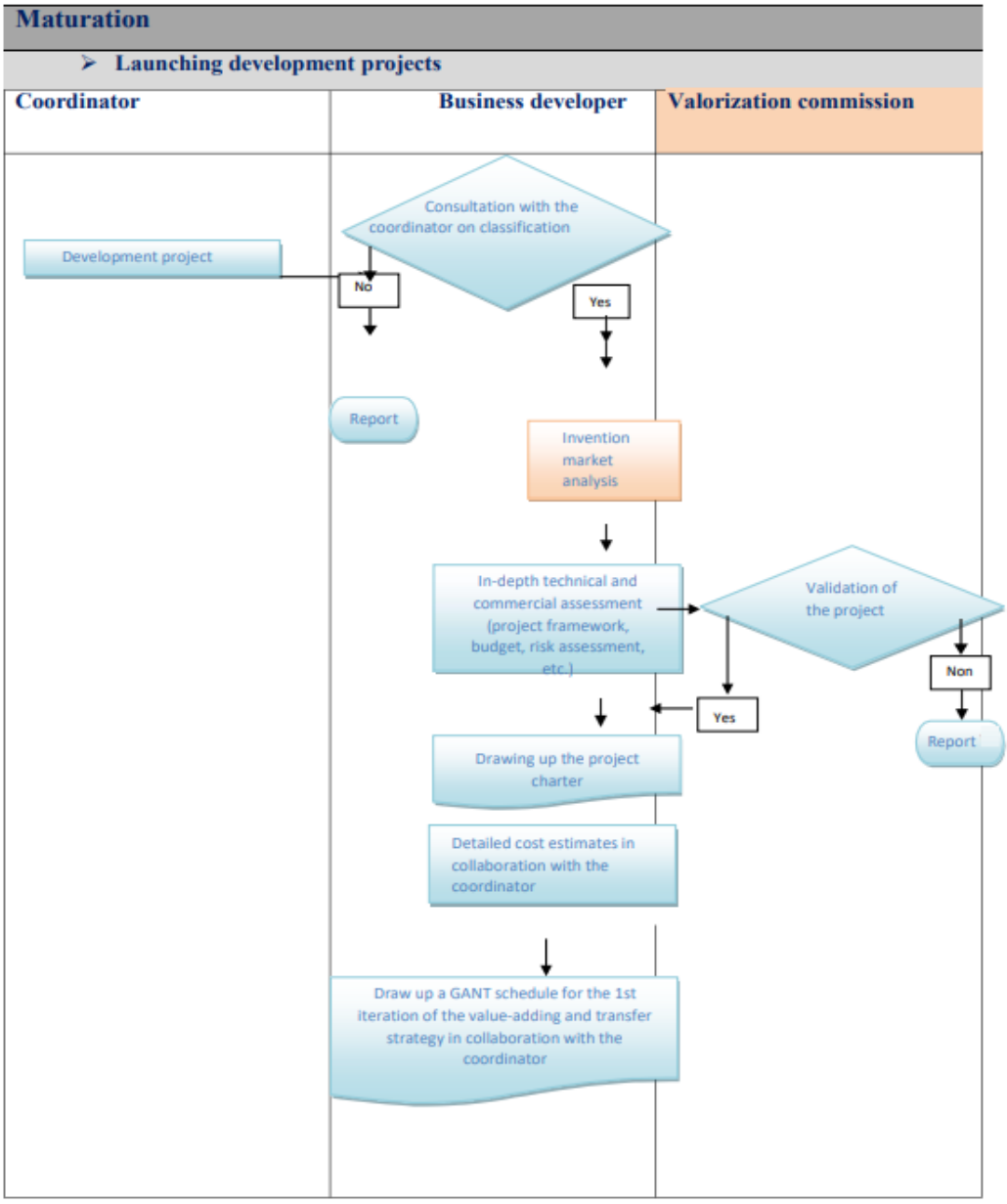

Figure 4. Maturation process

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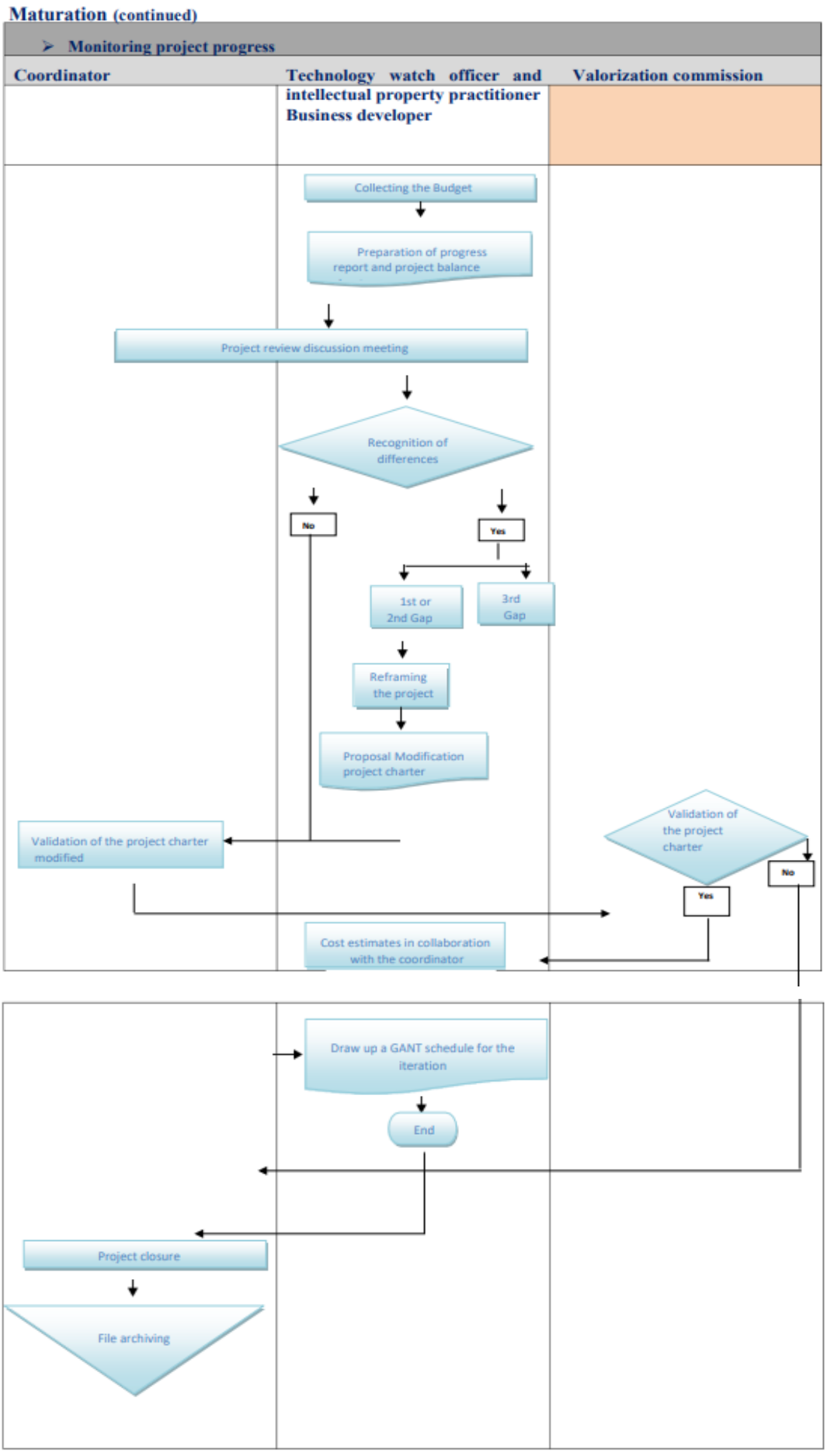

Figure 5. Maturation process(continued)

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The maturation process begins with the introduction of a development project by the coordinator, who then engages in discussions with the research and development project manager regarding the classification of the project. If the project is not approved and the criteria for its postponement are accepted by the coordinator, the project is then deferred. Conversely, if the project is approved and appropriately classified, the manager conducts a market analysis related to the invention, evaluating the competition, the marketing strategies of competing products, the strengths and weaknesses of the invention, as well as the opportunities and threats for its future commercialization. It should be noted that this analysis focuses on the invention itself, rather than on the final products intended for sale.

The technical and commercial evaluation phase, conducted by the manager, aims to refine the assessment of the invention by considering various factors such as project framing, budget planning, stakeholder engagement, and the identification of potential risks. The project charter and cost estimation are then developed by the manager and must receive approval from the valuation committee. Once the project is approved, the manager and the coordinator collaborate to accurately estimate the associated costs.

The project planning is illustrated through a Gantt chart, developed in collaboration between the manager and the coordinator, marking the start of the first phase of the valorization and transfer strategy. The monitoring of the project's progress is rigorously structured, including the collection of data related to the budget, deliverables, adherence to deadlines, identified risks, encountered difficulties, and achieved objectives. This follow-up is carried out at the end of each iteration or when the execution time exceeds 50 %, resulting in the drafting of a progress report and a project assessment.

When significant discrepancies are observed, either in terms of time or budget, a meeting is organized to analyze these divergences. If the observed gap is significant, the project may be recalibrated, potentially revising the project charter, subject to the approval of the coordinator and the committee. A disapproval of these adjustments by the commission leads to the closure and archiving of the project by the coordinator. In case of approval, the manager prepares a new cost estimate and plans the next phase using a Gantt chart, in collaboration with the coordinator. If discrepancies are observed three times, this will lead to the definitive closure of the project, with archiving of results and deliverables.

Protocol for transfer

The commercialization of invention patents revolves around several essential phases, starting with promotion. In this phase, the inventor takes the initiative to create communication materials such as prototypes or technical datasheets to facilitate the commercialization of their patents.[26] These materials must obtain the approval of the head of the valorization and transfer unit. Experience shows that the inventor is often the most capable of successfully conducting commercial prospecting, thanks to their in-depth knowledge of the invention.

When a potential client expresses interest, a crucial preliminary step involves the exchange of information within a confidential framework, formalized by a non-disclosure agreement signed by the prospect. This is followed by the negotiation of the concession or transfer agreement, where the terms of the agreement are defined in consultation between the client and the valuation and transfer unit, including the inventors, the director of the valuation and transfer unit (dcvt), and the vice president of research and development. (vprd). This agreement is finally co-signed by the VP and the client, marking a decisive step in the commercialization process.

The sharing of profits generated from the monetization of patents represents another critical phase.

A specific agreement is established between the university and the inventors, where the researcher transfers their rights to the university in exchange for a share of the revenues generated, in accordance with the licensing or technology transfer agreement signed between the parties. Regarding net revenues, an agreement must be reached among the inventors within three months to determine the distribution of profits. In the event of an agreement within the stipulated deadlines, the accounting department proceeds with the distribution of profits according to the established terms. In the absence of this, the distribution is carried out equally. This agreement also defines the concept of net valuation income and specifies the types of costs that the university institution deducts before revenue sharing, such as the operating expenses of the valuation unit, intellectual property (IP) protection costs, and expenses directly related to the research and development of the invention.

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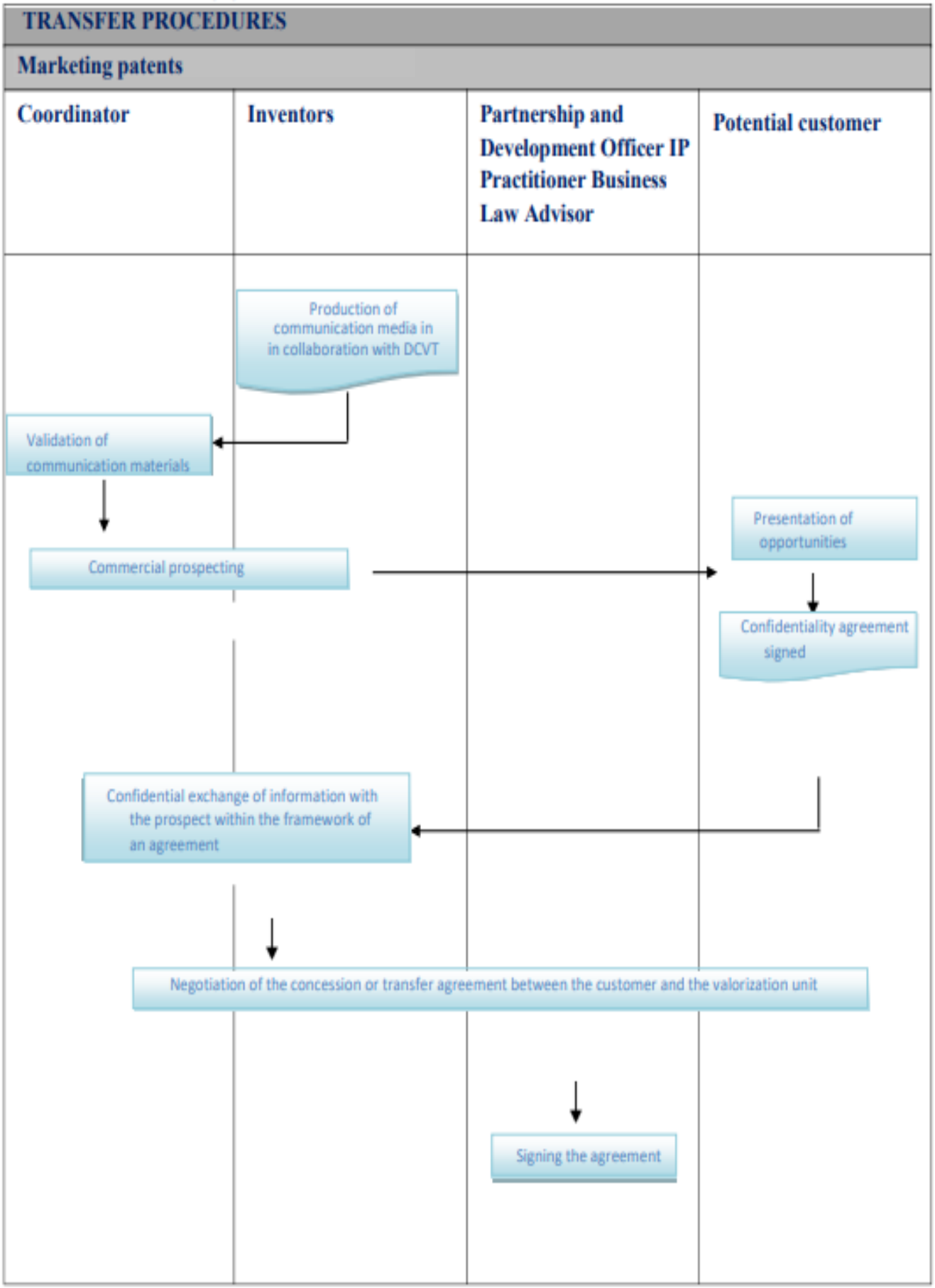

Figure 6. Transfer procedures

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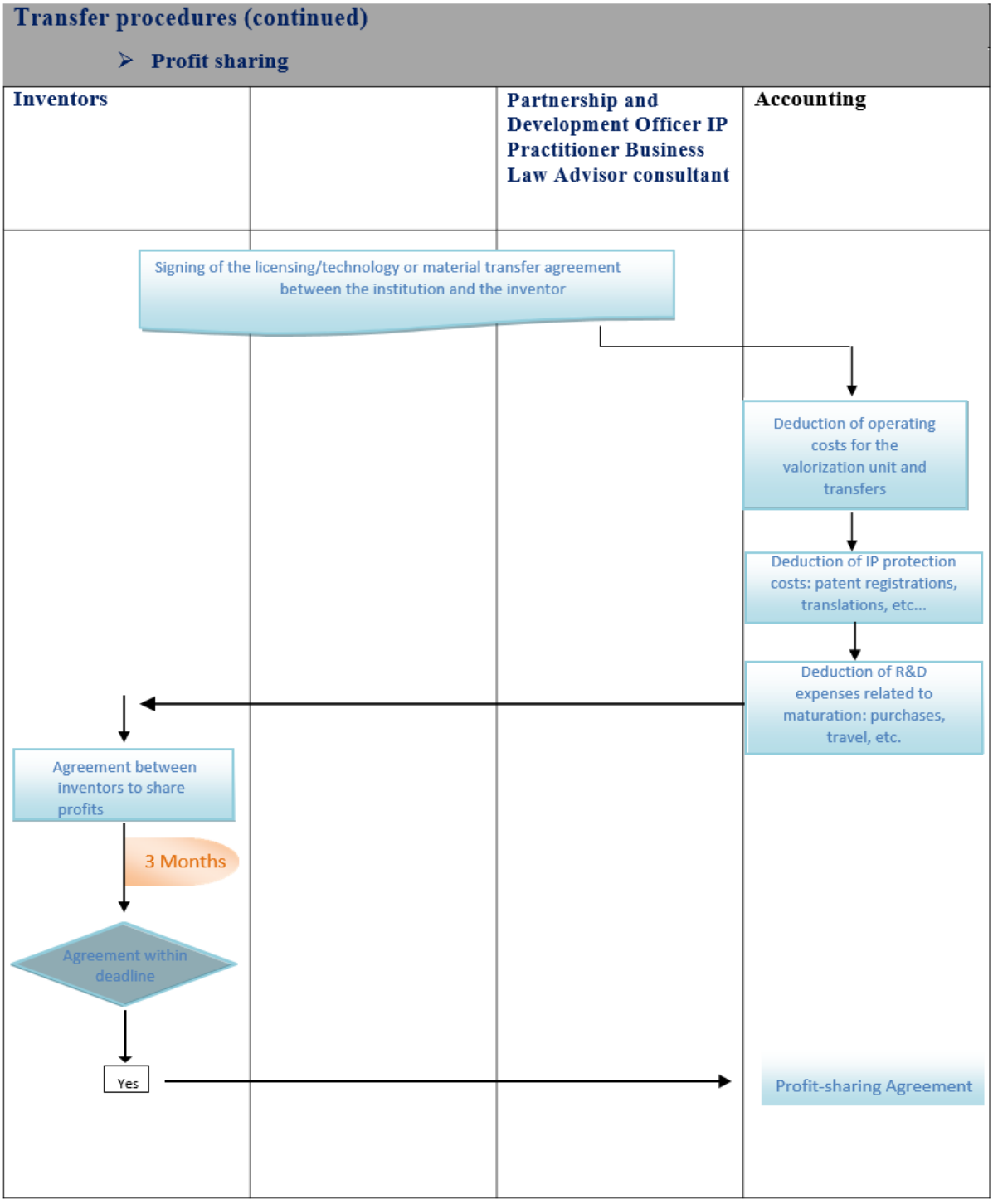

Figure 7. Transfer procedures(continued)

DISCUSSION

The growing prominence of innovation as a crucial catalyst for academic and economic advancement has compelled higher education institutions to reevaluate their strategies and organizational structures.[27] In this context, Moroccan universities, aligned with this global dynamic, have taken initiatives to formalize their innovation processes.[28] The procedures manual for innovation cities within these universities represents a crucial step in this direction. This document aims to standardize the processes related to technological monitoring, intellectual property management, the maturation, and the commercialization of innovations. The importance of this manual lies in its ability to provide a structured and coherent framework, thereby facilitating the effective and transparent management of innovation activities.

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First of all, the importance of standardizing procedures in innovation cities is crucial.[29] The manual in question provides a structured framework for the management and execution of activities related to innovation. This standardization is crucial to ensure a certain consistency in practices, thereby facilitating comparability and performance evaluation between different cities. However, it is essential to consider the balance between standardization and flexibility. Each innovation cities operates in a unique context, influenced by factors such as institutional culture, available resources, and the specific characteristics of the research and innovation environment. Consequently, a too rigid approach could limit the innovation and adaptability needed in a constantly evolving environment.

Secondly, the manual focuses on crucial aspects such as technological monitoring, intellectual property protection, and the commercialization of innovations. These elements are fundamental to supporting an effective innovation ecosystem.[30] Technological monitoring, in particular, is essential for maintaining a sharp understanding of emerging trends and technological advancements, allowing universities and researchers to remain competitive and innovative. However, the manual could benefit from greater attention to collaborative and interdisciplinary processes, which are key elements in promoting innovation. Collaboration between different disciplines and with industrial partners can generate innovative and diverse ideas, thereby contributing to a more dynamic and inclusive culture of innovation.

Thirdly, the implementation and monitoring of the procedures outlined in the manual presents a major challenge. It is imperative to develop effective mechanisms to monitor compliance and the effectiveness of established procedures. This involves not only the establishment of monitoring and evaluation systems but also the training and awareness-raising of the stakeholders involved. The engagement of stakeholders at all levels - from researchers to administrators - is crucial to ensure the adoption and effectiveness of procedures.

Finally, the aspect of change management is vital. Resistance may arise when new procedures are implemented, especially in academic contexts where tradition and academic autonomy are highly valued.[31] It is therefore essential to adopt a participatory and inclusive approach in the development and implementation of the manual, ensuring that all stakeholders are involved and that their perspectives are taken into account. This process must also be accompanied by clear communications and appropriate training to facilitate the transition to new practices.

In conclusion, the procedures manual for Moroccan universities' innovation cities represents an important step towards a more structured and systematic management of innovation. However, to ensure its success and long-term relevance, it is essential to take into account flexibility, interdisciplinarity, monitoring, and change management, while actively engaging all relevant stakeholders.

CONCLUSIONS

The "Manual of Procedures for Innovation Cities" of Moroccan universities represents an important milestone in the formalization and structuring of innovation processes. This manual focuses on the standardization of methodologies related to technological monitoring, intellectual property management, as well as the maturation and commercialization of innovations. Its objective is to provide a clear and coherent framework that promotes effective and transparent management of innovation activities. By establishing standardized procedures, the manual aims to ensure consistency in innovation practices while meeting performance and evaluation requirements across the various cities.

However, despite its strengths, the manual presents areas that require future research and development. Firstly, a deeper exploration of the balance between standardization and adaptability is necessary. It is essential to understand how these procedures can be applied flexibly to meet the unique cultural and institutional specifics of each innovation city. Secondly, the integration of collaborative and interdisciplinary processes within the framework of the manual could be improved. This could include the development of strategies to foster collaboration between academic disciplines and industry partners, thereby contributing to a richer and more diverse culture of innovation. For future work, it would be relevant to examine the impact of the implementation of the manual on the innovation performance of Moroccan universities. Empirical studies could be conducted to measure the effectiveness of these standardized procedures in improving the quality and quantity of innovations. Furthermore, it would be interesting to analyze how flexibility and adaptability can be incorporated into these procedures to better accommodate the rapid changes in technologies and markets. Finally, a study on the interaction between standardized procedures and the culture of innovation within universities could provide insights on how to optimize policies and practices to promote sustainable and effective innovation.

REFERENCES

1. I Taouaf, Y Marzougui, M Arouch, « Analysis-Diagnosis and Performance of a National System of Technological Innovation (NSTI): The Case of the Moroccan NSTI ». 7 juillet 2021.

2. K. Ayad, K. D. Bennani, et M. Elhachloufi, « Evolution of University Governance in Morocco: What Is the

Impact? », Int. J. High. Educ., vol. 9, no 5, p. 94-104, 2020.

3. F.-C. Tseng, M.-H. Huang, et D.-Z. Chen, « Factors of university–industry collaboration affecting university innovation performance », J. Technol. Transf., vol. 45, no 2, p. 560-577, avr. 2020, doi: 10.1007/s10961-018-9656-6.

4. H. Nahid et Y. Marzougui, « Which mode of governance for the innovation cities of Moroccan public universities? », J. World Intellect. Prop., vol. 26, no 2, p. 155-165, 2023, doi: 10.1111/jwip.12265.

5. M. Yassine, O. E. Attou, et M. Arouch, « Moroccan Public Universities Confronting the Challenge of Patent Valorization: Potentialities and Realities », Salud Cienc. Tecnol., vol. 4, p. 1001-1001, janv. 2024, doi: 10.56294/saludcyt20241001.

6. M. Mazhitov, Md. A. Uddin, M. Mahmood, et A. Ostrovskiy, « Competitive Advantages Through Strategy Implementation: the Role of People, Plan, and Process », Public Organ. Rev., janv. 2024, doi: 10.1007/s11115-024-00762-4.

7. M. C. Ungan, « Standardization through process documentation », Bus. Process Manag. J., vol. 12, no 2, p. 135-148, janv. 2006, doi: 10.1108/14637150610657495.

8. P. D'Iribarne, S. Chevrier, A. Henry, J.-P. Segal, et G. Tréguer-Felten, « Procedures and Control », in Cross-Cultural Management Revisited: A Qualitative Approach, P. d'Iribarne, S. Chevrier, A. Henry, J.-P. Segal, et G. Tréguer-Felten, Éd., Oxford University Press, 2020, p. 0. doi: 10.1093/oso/9780198857471.003.0006.

9. Alain Henry, Ignace Monkam-Daverat, Rédiger les procédures de l'entreprise. in Livres outils. 2001. Disponible sur: https://www.editions-eyrolles.com/Livre/9782708126480/rediger-les-procedures-de-l-entreprise

10. A. Fernández-Laviada, « Internal audit function role in operational risk management », J. Financ. Regul. Compliance, vol. 15, no 2, p. 143-155, janv. 2007, doi: 10.1108/13581980710744039.

11. R. Lenz et U. Hahn, « A synthesis of empirical internal audit effectiveness literature pointing to new research opportunities », Manag. Audit. J., vol. 30, no 1, p. 5-33, janv. 2015, doi: 10.1108/MAJ-08-2014-1072.

12. Protiviti, « Internal Audit Capabilities and Needs Survey | KnowledgeLeader ». Disponible sur: https://www.knowledgeleader.com/publications/2022-internal-audit-capabilities-and-needs-survey

13. M. Hammer et J. Champy, Reengineering the Corporation: A Manifesto for Business Revolution, Illustrated edition. New York: Harper Business, 2006.

14. J. Petkovic et al., « Protocol for the development of guidance for stakeholder engagement in health and healthcare guideline development and implementation », Syst. Rev., vol. 9, no 1, p. 21, févr. 2020, doi: 10.1186/s13643-020-1272-5.

15. KOUMETIO MIREILLE, MEKAM GRANGE, « UNE CONTRIBUTION A L'IMPLEMENTATION DU MANUEL DES PROCEDURES COMPTABLES ET FINANCIERES COMME DISPOSITIF DE CONTROLE INTERNE : CAS D'UN HOPITAL DE CASABLANCA AU MAROC ». Disponible sur : https://www.studocu.com/row/document/universite-ibn-zohr/methodologie-du-travail universitaire/27225-71923-1-pb-le-controle-interne/43964114

16. A. Belabdelli et N. Achoui, « Les procédures d'audit comptable pour diriger les objectifs, stratégiques », المجلة العلمية المستقبل للاقتصاد والتسيير, vol. 3, no 1, p. 357-394, déc. 2015.

17. Y. Marzougui, O. E. Attou, I. Taouaf, et M. Arouch, « Summary of the Evaluation of Cities of Innovation and Technology Transfer (CITT) at Moroccan Universities », Sci. Innov., vol. 20, no 5, Art. no 5, sept. 2024, doi: 10.15407/scine20.05.111.

18. G. E. Corazza et J. P. A. von Thienen, « Invention », in The Palgrave Encyclopedia of the Possible, Cham: Springer International Publishing, 2020, p. 1-9. doi: 10.1007/978-3-319-98390-5_14-1.

19. H. de Vries et V. Bekkers, « Innovation in the Public Sector: A Systematic Review and Future Research Agenda », 2016.

20. R. Hamouti, S. Saint-Yves-Durand, et Y. Castonguay, « Les effets des parcs scientifiques sur le processus d'innovation des entreprises : une étude de cas dans la province de Québec », Rev. Organ. Territ., vol. 32, no 2, p. 128-138, 2023, doi: 10.1522/revueot.v32n2.1605.

21. Ilham Taouaf, Omar Elyoussoufi Attou, S. El Ganich, M. Arouch, « The Technology Transfer Office (TTO): Toward a Viable Model for Universities in Morocco », in Cuadernos de Gestión, Enpresa Institutua - Instituto de Economia Aplicada a la Empresa, nov. 2021, p. 97-107. doi: 10.5295/cdg.191179it.

22. H. Nahid et T. MOSSADEK, « État des lieux de l'exploitation des brevets d'invention des universités publiques marocaines Current state of the exploitation of patents of Moroccan Public Universities" », juin 2015.

23. H. Chesbrough, « From Open Science to Open Innovation », in Open Innovation Results: Going Beyond the Hype and Getting Down to Business, H. Chesbrough, Éd., Oxford University Press, 2019, p. 0. doi: 10.1093/oso/9780198841906.003.0004.

24. WIPO - World Intellectual Property Organization, WIPO Patent Drafting Manual... Unknown, 2024. doi: 10.34667/TIND.48732.

25. Ompic, « Dépôt de Brevet d'Invention au Maroc ». Disponible sur: http://www.ompic.ma/fr/content/depot-de-brevet-dinvention-au-maroc

26. A. D. Grandi, P. Posocco, et L. Posocco, « Chapitre 2. Éléments d'attraction de la clientèle », Hors Collect., p. 127-133, 2022.

27. S. Frimousse et J.-M. Peretti, « L'innovation managériale dans les organisations publiques », Quest. Manag., vol. 39, no 2, p. 147-206, juill. 2022, doi: 10.3917/qdm.219.0147.

28. C. Hamieddine et M. Akioud, « L'université marocaine à la pointe de l'innovation : vers une approche de transformation durable », Rev. Fr. Econ. Gest., vol. 5, no 3, Art. no 3, mars 2024. Disponible sur: https://www.revuefreg.fr/index.php/home/article/view/1517

29. B. Debbagh et M. Ibrahimi, « Management de la connaissance, un levier de la Collaboration Université – Industrie (CUI) au Maroc », Altern. Manag. Econ., vol. 5, no 2, Art. no 2, avr. 2023, doi: 10.48374/IMIST.PRSM/ame-v5i2.39778.

30. Y. Gu, L. Hu, H. Zhang, et C. Hou, « Innovation Ecosystem Research: Emerging Trends and Future Research », Sustainability, vol. 13, no 20, Art. no 20, janv. 2021, doi: 10.3390/su132011458.

31. G. D. Caruth, « UNDERSTANDING RESISTANCE TO CHANGE: A Challenge for Universities », 2013.

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AUTHORSHIP CONTRIBUTION

Conceptualization: Yassine Marzougui, Omar Elyoussoufi Attou, Moha Arouch, Ilham Taouaf.
Data curation: Omar Elyoussoufi Attou, Ilham Taouaf.
Formal analysis: Yassine Marzougui, Ilham Taouaf, Omar Elyoussoufi Attou.
Research: Yassine Marzougui.
Methodology: Yassine Marzougui, Omar Elyoussoufi Attou, Ilham Taouaf.
Project management: Moha Arouch, Ilham Taouaf.
Resources: Omar Elyoussoufi Attou, Moha Arouch.
Software: Yassine Marzougui, Ilham Taouaf.
Supervision: Omar Elyoussoufi Attou, Moha Arouch.

Validation: Moha Arouch, Ilham Taouaf.
Display: Yassine Marzougui.
Drafting - original draft: Yassine Marzougui, Omar Elyoussoufi Attou, Moha Arouch.
Writing - proofreading and editing: Yassine Marzougui, Omar Elyoussoufi Attou, Ilham Taouaf.

ANNEX

Appendix I: Questionnaire for Developing a Procedure Manual for University Innovation Structures

Introduction:

- Presentation of the interview's objective and the research.
- Assurance of confidentiality and anonymity of responses.
- Request for consent to record the interview.

Section 1: General Information

- Name of the university:
- Innovation structure you are affiliated with:
- Your role within the innovation structure:
  - Manager
  - Researcher / Academic Staff
  - Student
  - Other (please specify):

Section 2: Technological Monitoring

- **Do you use digital information sources for technological monitoring activities?**
  - Yes
  - No
- **Which information sources do you primarily use? (Multiple answers allowed)**
  - Specialized databases
  - Professional social networks
  - Scientific publications
  - Other (please specify):
- **Does your structure have formal procedures for technological monitoring?**
  - Yes
  - No
- **What are the main challenges you face in technological monitoring? (Rank from 1 to 5, with 1 being the most important)**
  - Access to specialized databases
  - Lack of specific training
  - Difficulty in analyzing collected data
  - Lack of integration of monitoring results into the innovation processes
  - Other (please specify):

Section 3: Invention Declaration (ID)

- **Does your structure follow a formal procedure for Invention Declaration?**
  - Yes
  - No
- **What obstacles do you encounter in the ID process? (Multiple answers allowed)**
  - Lack of knowledge about intellectual property rights
  - Absence of clear procedures
  - Lack of administrative and legal support
  - Other (please specify):
- **Do you feel the need for a procedure manual to guide the ID process?**
  - Yes
  - No
- **What information would you like to see in this manual? (Multiple answers allowed)**
  - Detailed steps for ID
  - Document templates
  - Case studies
  - Other (please specify):

Section 4: Innovation Maturation

- Do you use a formal procedure for the maturation of innovations?

    - Yes
    - No
- **What are the main challenges related to the maturation of innovations in your structure? (Rank from 1 to 5, with 1 being the most important)**
    - Lack of specific funding
    - Insufficient knowledge of intellectual property and commercialization
    - Difficulty in collaborating with industry actors
    - Other (please specify):
- **Do you have access to training resources for innovation maturation?**
    - Yes
    - No

Section 5: Technology Transfer

- **Does your structure have formal procedures for technology transfer?**
    - Yes
    - No
- **What are the main challenges you face in this process? (Multiple answers allowed)**
    - Lack of awareness and training on legal and commercial aspects
    - Insufficient financial resources to support the process
    - Difficulty in negotiating licensing agreements with industrial partners
    - Other (please specify):
- **Do you believe that developing a procedure manual for technology transfer would be useful?**
    - Yes
    - No
- What recommendations would you make to improve the technology transfer process within your structure?

Section 6: Suggestions and Comments

- What other improvements do you suggest to strengthen innovation management within your university?
- Which aspects of the procedure manual should be prioritized, in your opinion?

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