Intellectual property challenges for the enterprise sector: the case of the Republic of Moldova

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Abstract. *Intellectual property rights (IPR) are increasingly recognized as key assets that stimulate innovation, support competitive advantage and boost a company's market value. For small and medium sized companies, intellectual property rights carry a highly significant weight. They help reinforce innovation and brand identity, which are essential for standing out in local as well as global markets. However, SMEs in the Republic of Moldova face considerable obstacles in making effective use of intellectual property. This paper examines the main challenges related to intellectual property rights encountered by Moldovan SMEs entrepreneurs. Using a mixed - method approach, the study is based on both primary insights derived from entrepreneur surveys and secondary materials, such as statistical data, international ranking, academic literature and analytical reports. The findings show that the awareness and use of IPR among Moldovan SMEs remain limited. A lack of financial and technical resources stands out as a major constraint. Entrepreneurs also encounter difficulties in understanding and applying the legal frameworks and procedures for obtaining and enforcing their IPR. These issues are further intensified by insufficient institutional support and limited collaboration between businesses and research institutions.*

Keywords: *innovation, small and medium enterprises, intellectual property, Republic of Moldova*
JEL classification*: O34, L26*

1. Introduction

Intellectual property rights (IPR) have experienced a remarkable transformation in recent years. They are no longer viewed solely as legal abstractions, now they become an important corporate asset that stimulates innovation, protects competitive advantage and enhances market value. This evolution is particularly evident in knowledge-based economies, where the effective management of intellectual property is increasingly recognized as an important determinant in bolstering economic expansion and business competitiveness. For SMEs, this role holds particular importance, as innovation and strong branding are essential for establishing and maintaining a competitive position in both domestic and international markets.

Intellectual property covers many types of creations, including patents, trademarks, copyrights, and trade secrets. Each serves its distinct strategic objectives important to firm success. When effectively used, intellectual assets can substantially improve enterprise performance, particularly in developing economies.

Enterprises based in the Republic of Moldova confront numerous difficulties in acquiring, managing, and enforcing intellectual property rights. Among the main challenges can be highlighted:

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limited financial resources, poor awareness, complex administrative procedures, a changing regulatory environment. These barriers hinder effective intellectual property management, especially for SMEs.

Research addressing these specific barriers remains surprisingly sparse. Existing studies on intellectual property challenges in emerging economies offer some insights, but they often overlook the unique economic and structural constraints present in Moldovan business environment.

To address this gap, this paper investigates the key challenges Moldovan enterprises face in relation to intellectual property. The study will explore the procedural, financial, and other obstacles encountered by Moldavian enterprises.

The specific research goals of this investigation include:

- To identify and analyze the major challenges faced by Moldovan enterprises in obtaining, managing, and enforcing their intellectual property rights.
- It will also tend to examine the entrepreneur's perspective on the process of intellectual property registration: procedural barriers, costs, time constraints.

This research study, therefore, brings in more inputs into the current state of academic knowledge on challenges of intellectual property in Moldova with recommendations for both policymakers and business leaders.

2. Methodology and data

This research employs a hybrid methodology, integrating empirical and descriptive analyses to investigate the IPR challenges encountered in Moldova. Primary data were collected via surveys administered to SME entrepreneurs, with a focus on their perceptions of IPR barriers. Secondary data were obtained from statistical reports, international rankings, and a review of pertinent literature.

Survey data. The survey was administered to a sample of 204 entrepreneurs representing various sectors, with the objective of eliciting their perceptions and experiences concerning the challenges associated with the process of obtaining IPR protection titles. Data collection took place between June and October 2022.The questionnaire was developed in collaboration with the author, and the sample was selected to be representative of the Moldovan business environment. The sample size of completed questionnaires was calculated against 60,300 registered firms (representing the entire national business pool recorded by the National Bureau of Statistics for 2021), using a 95% confidence interval. The sampling framework was developed to reflect the broader distribution of key characteristics. The collected data was aggregated and analyzed afterwards by the SPSS statistical analysis software. The measurement of entrepreneurs' perception about the procedure for obtaining intellectual property protection titles was done using a five-point Likert rating system. Measured on a scale: 1 = highly problematic; 2 = somewhat problematic; 3 = neutral; 4 = somewhat unproblematic; 5 = not problematic at all. Key findings are presented visually through various graphs and tables in the analysis.

Secondary data. Also, figures published by the National Bureau of Statistics, the Global Innovation Index, previous studies on Moldova's innovation state have been analyzed. Patent data, including applications, granted patents, and recent trends, were obtained from the State Intellectual Property Agency of Moldova.

3. Literature review

Numerous studies show that using intellectual property effectively serves as a major catalyst for innovation and assisting SMEs stay competitive (Burrone, 2005; Elton et al., 2002). However, studies conducted across various countries highlight that SMEs encounter numerous challenges in leveraging intellectual property systems effectively (Burrone, 2005; Derwent, 2000; Lloyd, 1995; Madrid-Guijarro et.al., 2009). These challenges often stem from limited awareness of intellectual property mechanisms (Burrone, 2005; Lima & Santos, 2018), inadequate resources, and the perceived complexity and cost of intellectual property management (Hall et al., 2015; Lloyd, 1995).

A recurring theme in the literature is SMEs' limited understanding of how the intellectual property system aligns with their business strategies and enhances competitiveness. Most firms view the intellectual property system as too complex and expensive to work with. For example, according to Derwent (2000) one of the most common barriers to innovation due to very high costs is patenting an

invention. Lack of familiarity of how to register and enforce patents, trademarks, industrial designs or other intellectual property rights limits SMEs' ability to use these tools to a greater extent. Weak intellectual property management further reduces their capacity to benefit from the system, often discouraging future use. In addition, limited access to qualified personnel or affordable legal support makes navigating the intellectual property system more difficult and lowers the likelihood of successful applications (Burrone, 2005).

In developed economies, SMEs often struggle with inadequate intellectual property management skills, limited access to specialized legal advice, and a lack of strategic focus on leveraging intellectual property assets (Elton, et.al, 2002). These limitations hinder their ability to extract value from patents and proprietary technologies, resulting in missed opportunities for licensing, technology transfer, and innovation commercialization. On the other hand, within developing markets like the Republic of Moldova, additional barriers increase the challenges faced by SMEs. These include weak technological infrastructure, low levels of innovation, limited awareness and understanding within the business environment about the role of intellectual property in improving competitiveness. Variability in legal frameworks, ineffective enforcement mechanisms, and the challenges of complying with international intellectual property agreements further intensify these issues (Lloyd, 1995). The lack of state support in the patenting process also discourages SMEs from engaging with formal IP protection mechanisms (Hall et al., 2015).

We have grouped the specific challenges impeding SMEs' use of intellectual property system identified in specialized literature in several categories:

- *Cost and complexity*. One of the main barriers mentioned in the specialized literature are the high costs to obtain and maintain intellectual property rights (Lima & Santos, 2018; Zulkifli, et.al., 2025). Recent data from Indonesia indicates that even with preferential fees for SMEs, cost barriers remain substantial, with SMEs considering official registration fees too high particularly amid economic constraints such as the COVID-19 pandemic (Wulansari, 2021). A recent study revealed that although SMEs with intellectual property rights generate 20% higher revenue per employee than those without, less than 9% of European SMEs actually own registered intellectual property rights (EPO & EUIPO, 2021), indicating that cost perceptions significantly deter adoption. Many SMEs view these costs as outweighing the potential benefits, particularly in low-margin industries (Kitching and Blackburn, 1998; Hall et al., 2015). In addition, the long and complex processes required to file intellectual property applications (Derwent, 2000; Hall et al., 2015; Zulkifli et al., 2025), heightened by the complexity of international agreements (Lloyd, 1995) make the process even more challenging.
- *Awareness and information gaps*. Another challenge is the limited awareness of the relevance and importance of intellectual property protection. According to the 2022 Intellectual Property SME Scoreboard, only 10% of SMEs have registered their intellectual property, with 35% citing a lack of perceived additional benefits as the primary deterrent, 20% believing their intellectual assets were not innovative enough, and 19% facing obstacles due to insufficient knowledge (EUIPO, 2022). Most SMEs are not aware that intellectual property is an intangible asset that can increase business competitiveness, nor do they have adequate information on official fees and procedures for intellectual property applications (Wulansari, 2021). This gap is particularly pronounced in less developed economies where resources for capacity building are scarce (Lima & Santos, 2018; Derwent, 2000; Kitching and Blackburn, 1998).
- *Management and infrastructure deficiencies.* A lack of management focus on intellectual property exploitation and inadequate infrastructure for deal-making and technology transfer prevent SMEs from fully exploiting their intellectual property assets (Elton et al., 2002). The absence of intellectual property culture among SMEs means intellectual property protection is not considered a priority, resulting in businesses operating without proper intellectual property protection and taking unnecessary risks (Wulansari, 2021). Without appropriate intellectual property strategies, firms often fail to leverage patents and proprietary technologies to generate revenue.
- *Skilled personnel and training*. The inability to recruit and retain highly qualified personnel further limits the ability of SMEs to use the intellectual property system effectively. Studies highlight a lack of on-the-job training and access to expertise as critical barriers (Silva et al., 2008; Madrid-Guijarro et al., 2009). Key enforcement challenges include lack of training and knowledge by judiciary and law

enforcers, insufficient publicity for intellectual property laws and regulations and slow, non-transparent legal appeal processes (Wulansari, 2021).

- *Global competition and counterfeiting*. SMEs also face external pressures, such as competition from larger organizations and international piracy of intellectual property. An OECD recent report analyzing the economic impact of illicit trade in counterfeit goods on SMEs found that 15% of SMEs who own intellectual property have experienced infringement, rising to 19.4% for innovative firms; crucially, enterprises subjected to IP infringement see a 34% drop in survival prospects relative to their unaffected counterparts (OECD & EUIPO, 2023). Counterfeit goods infringing SMEs' intellectual property mostly come by mail from China and Hong Kong, most commonly affecting sectors such as electronics, electrical machinery, apparel, fashion items, cosmetics, perfumery, and toys (OECD & EUIPO, 2023). These challenges are particularly detrimental in industries that rely on their own innovation (Lloyd, 1995).
- *Digital transformation challenges.* Recent analysis indicates that the shift toward digital technologies, such as cloud-based systems, electronic communications and portable storage devices, has contributed to increased trade secret infringements, with additional vulnerabilities for SME intellectual property protection arising from workforce mobility, evolving employment arrangements, and fragmentation of global value chains (Kergroach, 2021).

Table 1 summarizes the main barriers identified in the specialized literature, categorizing them by type and providing relevant sources.

Table 1. Overview of barriers faced by SMEs in using intellectual property

Category	Challenges	Authors
Costs	High costs of obtaining and protecting intellectual property rights	Derwent (2000); Hall et al. (2015); Kitching and Blackburn (1998), Lima and Santos (2018); Wulansari (2021); Zulkifli et.al. (2025)
	Costs outweigh the potential benefits for many SMEs	Hall et al. (2015)
Time and complexity	Lot of time required for submitting applications	Derwent (2000); Hall et al. (2015)
	Complexities of navigating international agreements	Lloyd (1995)
	Data rights protection and cross-border infringement complicating traditional frameworks	Yao (2024)
Information and awareness	Insufficient information on the relevance and importance of intellectual property	Burrone (2005); Lima and Santos (2018); Wulansari (2021)
	Lack of awareness of formal protection mechanisms	Lima and Santos (2018)
Management and infrastructure	Lack of management focus on intellectual property	Elton et al. (2002), Burrone (2005)
	Insufficient deal-making infrastructure	Elton et al. (2002)
Competition and piracy	International piracy of intellectual property rights	Lloyd (1995), OECD & EUIPO (2023)
	Competition from larger organizations	Lloyd (1995)
Skilled personnel	Lack of access to and difficulty retaining qualified personnel	Silva et al. (2008); Madrid-Guijarro et al. (2009); Duarte et al. (2017)
	Lack of on-the-job training for employees	Silva, Leitão and Raposo (2008); Madrid-Guijarro et al. (2009); Duarte, Madeira et al. (2017)
Digital transformation challenges	Increased vulnerability to trade secret infringement through digital technologies and data management systems	Kergroach (2021); Almeling (2012)

Source: author's synthesis derived from the reviewed literature

4. Research results and comments

This section analyses the IPR challenges of Moldovan enterprises, organized around a number of key themes identified from the literature review, including the results of a survey with entrepreneurs and data analysis of patenting activity of Moldovan enterprises, etc.

4.1. Low understanding regarding the significance of intellectual property assets

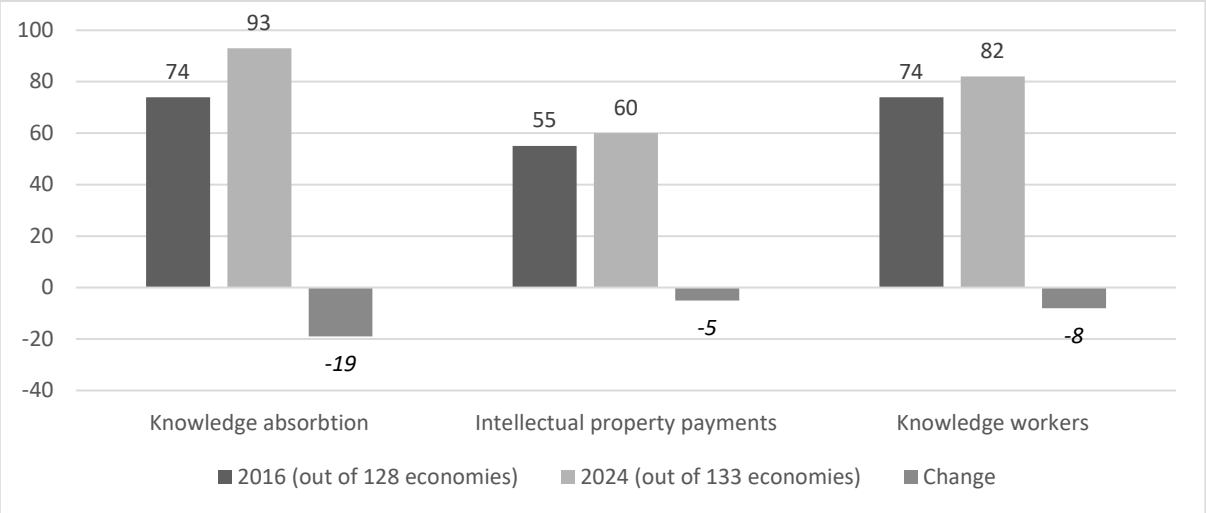
The majority of commercial entities operating in Moldova possess a low understanding of the strategic importance of obtaining intellectual property protection, the same as in many other emerging economies. It is commonly observed that many enterprises do not recognize the competitive advantages arising from securing a patent, trademark, or copyright for their work. This minimal awareness not only leaves innovative work poorly protected but also deters companies from investing in R&D (research & development) since the improvements can easily be imitated. Further, the lack of an established intellectual property culture in the business community becomes a self-sustaining cycle of this problem and undermines motivation to pursue intellectual property education and awareness initiatives.

The trends illustrated in the accompanying figure provide an overview of Moldova's rankings across three key indicators related to intellectual assets and knowledge systems, as reported in the Global Innovation Index. These indicators reflect the country's relative performance in knowledge absorption, intellectual property payments and the prevalence of knowledge workers.

The indicators shown in Figure 1 below are based on data from the *Global Innovation Index*, jointly issued by WIPO, INSEAD, and Cornell University.

- *Knowledge absorption* is an aggregated metric and captures a nation's ability to acquire and integrate external knowledge and technology, encompassing variables such as high-technology imports (as a percentage of overall trade), ICT service imports (% of total trade), and payments for the IPR usage (royalties and license fees).
- *Intellectual property payments* measure fees for utilizing unclassified IPR, calculated as a share of overall trade (three-year mean). This indicator captures payments made by domestic entities for the authorized exploitation of protected assets, including patents, trademarks, copyrighted material, industrial designs, trade secrets, and franchising agreements, as well as rights granted to duplicate or disseminate intellectual property contained within underlying original works (e.g., software, manuscripts, cinematographic works, sound recordings). It serves as a proxy for technology transfer and the acquisition of foreign knowledge assets.

Figure 1. Trends in Knowledge absorption and Intellectual property payments rankings for the Republic of Moldova (Global Innovation Index Rankings, 2016–2024)



Source: based on Cornell University, INSEAD, and WIPO, 2016; WIPO, 2024.

- *Knowledge workers* is a composite indicator that encompasses five dimensions: the share of knowledge-intensive employment in the workforce, the prevalence of formal training programs in firms, business spending on R&D as a share of GDP, the percentage of research activities financed by business enterprises, and the proportion of women in employment holding high-level university degrees.

All indicators belong to the *Business Sophistication* pillar of the GII framework. A higher numerical rank corresponds to weaker relative performance compared to other economies.

The data shows a steady decline in Moldova's performance in these indicators over time. In the period 2016 - 2024, Moldova's ranking for knowledge absorption declined significantly from 74th to 93rd place. This drop highlights a low capacity of enterprises to effectively benefit from external knowledge. The ranking for intellectual property payment also deteriorated slightly, sliding from 55th to 60th. This may indicate a limited participation of Moldovan enterprises in acquisition or investing in intellectual property assets such as patents and licenses. Additionally, a decline from 74th to 82nd position, was registered for the indicator knowledge workers. The decline in the number of knowledge workers affects the availability of skilled professionals capable of promoting innovation and managing intellectual property within organizations. All these trends point to some systemic issues, such as low levels of understanding concerning the significance of intellectual property rights role within Moldova's innovation ecosystem.

Keeping this fact in mind, the state agency has taken some steps towards raising awareness and informing businesses to deal with intellectual property. The State Agency for Intellectual Property makes use of its website, seminars, round tables, and exhibitions to familiarize SMEs with the national system of intellectual property. The most intensive way of support is the intellectual property pre-diagnosed service, which analyzes the existing intellectual potential of a company and elaborates recommendations regarding strengthening its legal protection but also helps firms identify competitive advantages that can be reinforced by proper intellectual property management. Beyond awareness initiatives, the State Agency for Intellectual Property supports enterprises by offering consultations and assistance in compiling applications for intellectual property protection, ensuring that businesses have access to the necessary tools to integrate intellectual property into their strategic planning.

4.2. Underdeveloped patenting system

Moldova’s patenting system, like those in many emerging economies, faces structural limitations that reduce its accessibility and effectiveness, particularly in the case of small and medium businesses. One key issue remains the limited level of Moldovan enterprise engagement in patent filing. As shown in Table 2, patent applications submitted by enterprises made up only 1.6% of total applications between 2010 and 2022. While some SMEs may file patents under the names of founders or employees as individuals, and those, potentially distorting the data, this low share still points to a deeper issue, namely, businesses are not well-integrated into the national innovation framework.

The data also show that universities and research institutions dominate the patent filing, jointly they account for over 53% of total applications. Individual applicants represent another substantial share (35%), although many of these filings are unlikely to lead to commercialized innovations due to the inherent difficulties that individuals face in scaling and monetizing patents. This imbalance may highlight the weak involvement of SMEs in the innovation process.

Unlike academic institutions, which often pursue patents to fulfill research or evaluation metrics, SMEs could use patents strategically, particularly to strengthen their market positioning, differentiate their products, or attract investment. However, as Table 2 indicates, most Moldovan enterprises are not capitalizing on these opportunities through intellectual property protection.

These figures where higher education institutions and academic organizations dominate the patent system while enterprises contribute little may suggest not only a lack of awareness or prioritization of intellectual property among businesses, but also the presence of structural barriers that affect smaller companies more acutely.

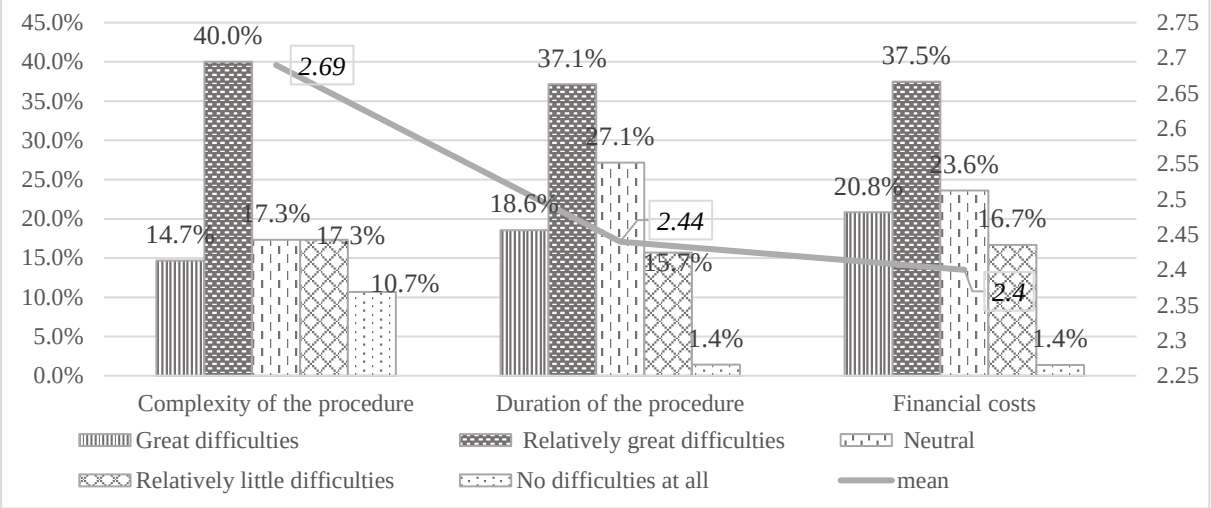
Table 2. Applications for protection of inventions filed by national applicants (2010–2022), number of applications

Category	2010	2022	2010–2022 Total	% of Total (2010-2022)	2022/2010 (%)
Legal persons – total	*218*	*106*	*2002*	*65.0*	*48.6*
Higher education institutions	91	51	843	27.4	56.0
Academic institutions	82	41	848	27.5	50.0
Branch research institutions	41	11	261	8.5	26.8
Enterprises and organizations	4	3	50	1.6	75.0
Natural persons	*121*	*44*	*1078*	*35.0*	*36.4*
Total	339	150	3080	100.0	44.2

Source: own calculation based on (National Bureau of Statistics of the Republic of Moldova, 2024).

The results of the survey with entrepreneurs confirm these findings. As illustrated in Figure 2, financial costs, procedural complexity, and lengthy approval procedures are perceived as major obstacles to navigating the patenting system.

Figure 2. Entrepreneurs' opinions on the procedure for obtaining intellectual property protection, %



Source: formulated by the authors following a survey of Moldovan business owners (Institutul Național de Cercetări Economice, 2022).

Respondents rated these challenges on a scale from 1 (very difficult) to 5 (not difficult). Cost emerged as the most significant barrier (mean =2.40), followed closely by long processing time (mean =2.44) and complexity (mean =2.69). These results suggest that the intellectual property system is not only expensive, but also administratively demanding. This makes it particularly difficult to use for businesses with limited resources or expertise in intellectual property management.

The long duration of the approval process of a patent is particularly problematic in industries with very short product life cycles, where innovations can become outdated before legal protection is obtained. Burdensome procedures also add to these problems. The inability of an SME without an intellectual property team to deal with such a system means lower participation in the patenting process and lost opportunities to develop competitive advantages in the marketplace.

4.3. Financial barriers to R&D and intellectual property investment

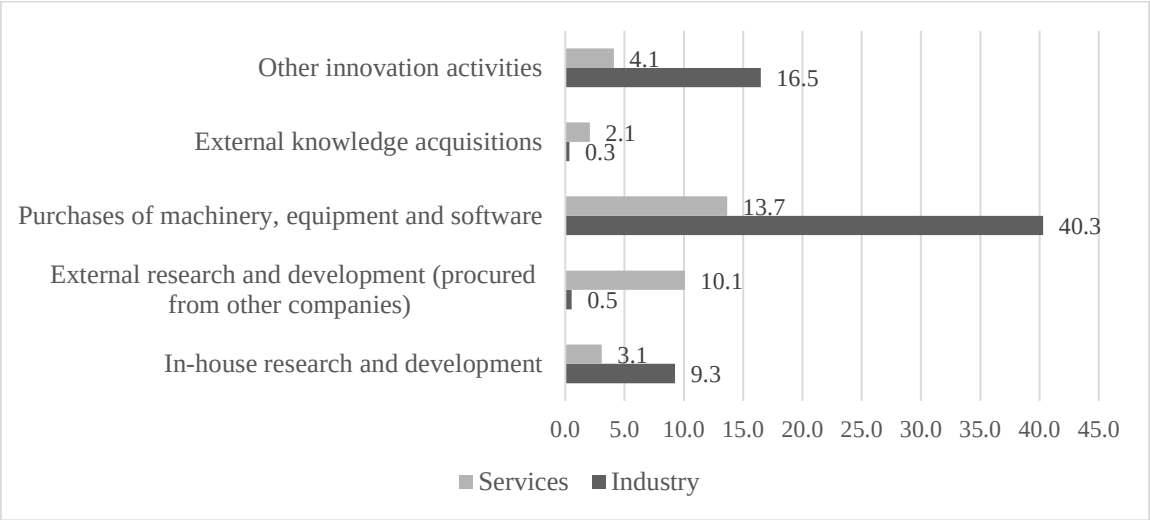
The financing of R&D remains one of the most serious challenges for the development of innovative activities for intellectual property protection. Limited economic performance with a low and constantly decreasing share of R&D expenditures in Moldova's GDP creates generally unfavorable conditions for considering investments in innovation. This is further aggravated by the specific effects

of generally low financial supply, partial government support and lack of sufficiently stimulating financial incentives for innovation development. The Republic of Moldova does not have effective financial and tax instruments to support innovation activities and commercialization of intellectual property objects. Normative acts do not provide for the designation of enterprises as "innovative enterprises" or products as "innovative products". Clear criteria for the degree of novelty of products or technologies have not been established yet.

a) Low R&D expenditures. According to the National Bureau of Statistics' data on business expenditure on innovation in 2021-2022, there is a worrying trend in spending priorities. Internal R&D accounts for only 9.3% of total innovation spending in the industrial sector and only 3.1% in the service sector (Figure 3). Investment in external R&D is even lower, at 0.5% for industry and 10.1% for services. The largest share of innovation expenditure is directed towards the acquisition of equipment, software, and other tangible assets, accounting for 40.3% in industry and 13.7% in services

These figures may suggest that Moldavian enterprises are oriented mostly towards a short-term solution, such as the purchase of technology, rather than longer-term R&D investments that might lead to patentable inventions. In our opinion, this imbalance in the structure of expenditure associated with innovation may reflect the existence of financial constraints and a lack of strategic focus on developing innovation through R&D efforts.

Figure 3. Structure of expenditure associated with innovation of enterprises in industry and services, 2021-2022 (% of total expenditure on innovation)



Source: elaborated based on National Bureau of Statistics of the Republic of Moldova (2021)

b) High costs of intellectual property protection. The high costs associated with intellectual property registration and maintenance further hinder businesses, particularly startups, SMEs, and individual inventors, from pursuing intellectual property protection. According to survey results, 58% of entrepreneurs reported facing significant financial difficulties when obtaining IPR (Figure 2). These barriers can discourage many entrepreneurs from applying for patents or other forms of protection, even when their innovations hold real market potential.

The financial burden includes direct costs of filing and maintaining IPR and indirect costs, such as hiring legal or technical expertise to navigate the process. For smaller enterprises, these expenses are often too high, forcing them to either forego intellectual property protection entirely or rely on less costly alternatives, such as trade secrets.

All these factors combined, weaken the innovation ecosystem, characterized by low R&D investment, high costs related to intellectual property and limited government support. Without high investment in R&D, it is not possible for enterprises to develop new products or processes; this automatically lowers their competitiveness across local and international marketplaces. The lack of intellectual property protection further decreases the probability of foreign investment, as most

international partners would prefer collaboration in an environment with a robust and affordable intellectual property system.

4.4. Cultural attitudes towards IPR and innovation

Cultural aspects have a decisive role in influencing the adoption of IPR practices and, as a result, the generation of innovation. In the Republic of Moldova, the strategic value of intellectual property remains largely unknown among the general population. This situation is not specific only for enterprises but also reflects the general stance of academic and research institutions, which are normally expected to lead the way toward innovation. Despite some patenting activity by research institutions, the percentage of patents maintained in force beyond the initial five-year term is alarmingly low. National applicants, who have obtained a total of 4,061 patents, maintain only 173 patents in force (4.3% retention rate) (Table 3). There is even a lower retention rate among specific categories. Thus, the retention rate for natural persons is 3.2%, for research institutions is 4.1% and for SMEs is 0.7%. In contrast, foreign applicants maintain 17.6% of their patents. This highlights, in our opinion, a significant gap in how domestic and foreign stakeholders perceive or realize the value of patent protection.

Table 3. Rate of patents maintained in force by different categories of holders

	Total patent issued (number)	**Total valid patent (number)**	**% of valid patent**
National applicants, from which:	***4,061***	***173***	***4.3***
Natural persons	1,419	46	3.2
Legal persons − total, from which:	***2,642***	***127***	***4.8***
Research institutions	2,277	93	4.1
SME	139	1	0.7
Foreign applicants	584	103	17.6
Total	**4,645**	**276**	**5.9**

Source: State Agency of Intellectual Property of the Republic of Moldova (2025). Invention database.

The low retention rates among national applicants are not mainly driven by maintenance costs, which were minimal before 2006. Instead, they reflect the limited economic potential of the patented technologies. When patents are seen as having little market value, inventors and institutions are less motivated to maintain them, weakening the link between innovation and commercial impact.

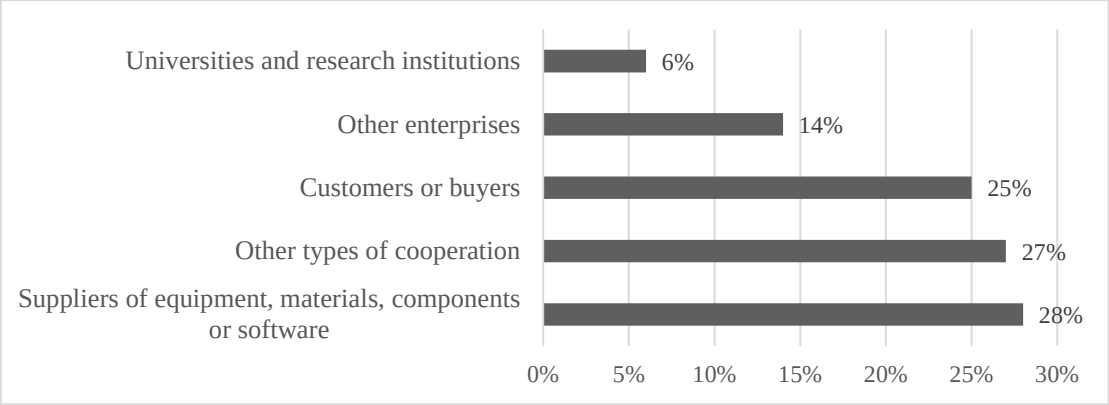
Another indicator of Moldova's underdeveloped innovation culture is the weak cooperation between the business sector and research institutions. The Global Innovation Index Report 2024 places Moldova 107th out of 133 countries for University - Industry R&D collaboration, a decline of 2 places compared to the previous year.

Data from the National Bureau of Statistics on innovation activities in enterprises highlights the following (Figure 4):

- only 6% of innovative enterprises indicated collaboration with universities and research institutions.
- the majority of cooperation occurs with suppliers of equipment, materials, components, or software (28%)**,** followed by customers or buyers (25%) and other enterprises (14%).

This lack of synergy between academia and industry stifles technology transfer opportunities and discourages the commercialization of research outputs. It reflects a broader cultural divide between the theoretical potential of innovation and its practical implementation. The reliance on external technology acquisition is another cultural trend that limits the growth of an innovation-driven economy. Enterprises in Moldova focus predominantly on acquiring foreign equipment and technologies rather than developing or co-developing their own. This approach is more predictable and less risky than investing in in-house research or collaborations, but it reduces the incentives to engage with the IPR system.

Figure 4. Structure of innovative product and process enterprises according to type of cooperation, 2021-2022, %



Source: elaborated based on National Bureau of Statistics of the Republic of Moldova (2021).

4.5. Human capital constraints

One of the main obstacles to implementing innovation and using effectively intellectual property rights in Moldova is the shortage of qualified human capital. This issue plays out in two main areas, namely a limited number of IPR specialists and a broader skills gap in the workforce needed to support innovation.

In many Moldovan companies, intellectual property tasks are typically assigned to an in-house legal staff. However, their involvement is usually limited to obtaining protection titles, renewing their validity, and resolving disputes, with minimal involvement in guiding the strategic use of IPR for business development (Moghilda, 2017). This reflects a broader issue, as there are too few professionals who can assist businesses in handling the technical and legal processes of patenting, licensing, and using intellectual property to create commercial value. Cooperation between intellectual property specialists and technology transfer offices is also uncommon, which further reduces the practical use of IPR tools in the country.

The skills shortage goes beyond intellectual property specialists. Entrepreneurs frequently report difficulties in hiring qualified engineers, technologists, and skilled programmers, professionals that are necessary for the integration of new technologies, improving processes, and implementing innovation (Novac, 2023). Without them, businesses struggle to grow and adapt. Employers also mention challenges in finding people with the specialized knowledge needed to support innovation in sectors where an understanding of technical and legal aspects of intellectual property is required when managing patents and licenses (Novac, 2023).

This disconnect is deepened by a mismatch between what the education system produces and what the labor market demands. The 2019 Business Environment and Enterprise Performance Survey (BEEPS V) illustrates this clearly, showing that around 20% of Moldovan firms view the skills mismatch as a major barrier to their activities. This is more than double the average of less than 10% reported in peer countries across Europe and Central Asia. Such a disparity highlights the urgent need for alignment between educational outputs and labor market demands (European Bank for Reconstruction and Development, 2019). Survey data collected over several years by the National Institute for Economic Research confirms this gap, with entrepreneurs expressing significant dissatisfaction with the competencies of graduates from educational institutions. Notably, 54.7% rated graduates' skills at the lowest level, while 64% of entrepreneurs gave a minimum score for the supply of highly trained personnel on the labor market (Novac, 2024).

The severity of this issue is further illustrated by the fact that around 50% of Moldovan entrepreneurs face difficulties in accessing various categories of personnel, particularly those with advanced qualifications (Novac, 2024). Entrepreneurs themselves also face limitations in their capacity to innovate. Many lack adequate knowledge about innovations and struggle to interpret scientific research that could be implemented in their enterprises. This "language barrier" between scientific

results and business needs makes it difficult for entrepreneurs to recognize the potential value of research outputs (INCE, 2014).

The shortage of managerial skills adds another layer to the problem. Many entrepreneurs face difficulties in running innovation projects, especially when they need to coordinate several at once. This limits their capacity to effectively lead innovation efforts and reduces the chances of turning new ideas into viable products or services. Collectively, these human capital constraints significantly hinder the integration of intellectual property rights and innovation into Moldova's business ecosystem.

4.6. Market-related challenges

In emerging economies like Moldova, market-related challenges significantly hinder the practical application and commercialization of IPR. While intellectual property frameworks exist, their underutilization and misalignment with market needs create barriers to fostering innovation and driving economic development.

A particularly acute challenge is the underutilization of patents filed by national applicants. Many of these patents remain "shelf patents", existing solely to fulfill academic or performance evaluation requirements rather than being commercialized. Such a trend is evidenced by the minimal proportion of patents maintained in force, which would signal something was wrong between patenting activity and real market value.

Local businesses are often unable or lack incentive to manage and exploit intellectual property portfolios. This hinders the development of Moldova's innovation ecosystem, where patents cannot support competitive advantage, technological progress, or efficiency in an economy.

Another notable challenge is the dominance of foreign entities in patent ownership. Many multinational companies conduct their research and development (R&D) activities outside Moldova, which limits access of local firms to high - value intellectual property. This situation slows the growth of the domestic innovation ecosystem and increases the dependence of enterprises on imported technologies.

In Moldova, intellectual property commercialization typically involves mechanisms such as licensing, assignment, pledging and franchising. However, these are not widely used by Moldavian enterprises. As shown in the table below, most contracts registered with the State Agency on Intellectual Property are assignments, while licensing, pledging, and franchising agreements make up only a small portion. One contributing factor is that registration of these contracts is optional, except for assignments, which reduces the visibility and protection of transferred intellectual property rights. Without mandatory registration, it’s harder to enforce these agreements, which makes them less appealing as tools for generating value from intellectual property.

Table 4. Contracts for the sale of industrial property objects registered with State Agency on Intellectual Property (2011-2020) (number of contracts)

Contract type	2011-2015	2016-2020	Total	%
Assignment	860	680	1,540	85.7%
License	121	81	202	11.2%
Pledge	25	2	27	1.5%
Franchising	23	4	27	1.5%

Source: State Agency on Intellectual Property of Republic of Moldova, 2021.

4.7. Limited support structures for technology transfer

The infrastructure for technology transfer remains underdeveloped in Moldova, with mechanisms for transferring research outputs to industry still in their infancy. Technology transfer offices, where they exist, are often only partially functional, and there is a general lack of information and resources to support the commercialization of research findings. According to the findings of the UNECE study (2021), the innovation and technology commercialization processes in Moldova are inadequately supported, a challenge further exacerbated by declining public sector investment in R&D and minimal business enterprise R&D expenditure. Moreover, direct foreign capital inflows, which

could drive innovation, facilitate technology transfer, create positive domestic spillovers, and develop skills and new market opportunities, remains largely absent from the country's developmental framework (UNECE, 2021).

This lack of support complicates the process for businesses and research institutions alike, preventing efficient collaboration and diminishing the impact of innovative projects that could otherwise benefit the private sector. Furthermore, there is no effective incentive mechanism for IPR commercialization. The relevant tax and customs benefits for science and technology parks, initially introduced by the Law governing Scientific and Technological Parks alongside Innovation Incubators and the tax and customs legislation in 2009, were abolished in 2012.

Data from a number of research projects carried out in the last years at the National Institute for Economic Research from Republic of Moldova (INCE, 2014) show that semi-structured interviews with academia and businesses have identified one of the main constraints: the lack of knowledge by the researchers and university specialists on how to commercialize intellectual property products.

Moreover, the mindset and approach of some scientists, particularly those from older generations, often do not prioritize the commercialization of their research. Until recently, the funding landscape for scientific projects also provided little incentive for the commercialization of research outcomes. Additionally, many researchers lack entrepreneurial skills and orientation, which are essential for translating their work into marketable innovations (Stratan et al., 2020).

5. Conclusion

This study highlights several key challenges that Moldovan enterprises face when managing intellectual property rights and innovation. Although IPR can strengthen competitiveness and support economic growth, many businesses, particularly SMEs, still struggle to use it effectively. A major issue in this aspect is the limited awareness of the strategic importance of intellectual property. Most enterprises do not fully recognize the role that patents, trademarks and copyrights can play in supporting their business goals. As a result, innovation is hindered and investments in research and development remain low. This shortfall is further manifested in an underdeveloped system of patenting, especially low business involvement in patenting. SME's, anticipated to serve a key function in driving economic growth, represent merely a minor proportion of patent applications. Structural barriers, such as high costs, complex procedures, and long processing times make the patenting process particularly difficult for smaller firms and startups. These challenges limit their ability to protect innovations and capitalize on intellectual property as a tool for growth.

Financial constraints within enterprises, such as insufficient R&D expenditure and the high costs of intellectual property protection further weaken Moldova's innovation potential. Many enterprises adopt a short-term perspective and invest more in equipment and technologies over long-term R&D. Such a position results in lowering their capacity to create patentable innovations. Cultural attitudes also contribute to this situation, as weak cooperation between businesses and research institutions, combined with low patent retention rates, reflects the undervaluation of intellectual property.

Policy implications

Drawing upon these results, we propose a series of strategic interventions to strengthen Moldova's intellectual property and innovation ecosystem:

- Enhance awareness and capacity building on IPR. There is a need for a national awareness program that helps entrepreneurs, SMEs and research institutions understand the strategic value of intellectual property. This could be achieved by integrating IPR-related topics into business and technical curricula and organizing regular workshops in partnership with the national IP authority (AGEPI) and business associations. The goal is to shift the prevailing mindset, those helping stakeholders see intellectual property not merely as a legal formality, but as a genuine business asset.
- Simplify and accelerate patenting procedures. The current administrative processes need streamlining. By setting clearer and faster examination timelines, we can make the IPR system more accessible, especially for SMEs. A fast-track mechanism for innovations in rapidly evolving sectors would be particularly valuable, preventing the frustrating scenario where technologies become obsolete before legal protection is even granted.

- Strengthen cooperation between research institutions and enterprises. Policy instruments must actively promote joint research projects, technology transfer partnerships and public-private innovation platforms. We recommend establishing a structured mechanism to identify entrepreneurs' research and innovation needs, developed in collaboration with sectoral ministries and informed by business community surveys. Alongside this, targeted working visits and partnership missions between universities and enterprises could help identify companies interested in technology transfer and build lasting relationships between academia and the private sector. Encouraging universities and R&D centers to align their research with market realities, while creating meaningful incentives for firms to adopt these results, would significantly improve the commercialization rates of national patents and enhance the practical relevance of research outputs.
- Develop human capital for innovation management and IPR. Specialized training programs for IPR managers, patent attorneys and innovation consultants are essential. Building these competencies within enterprises would ensure that intellectual property is used strategically to drive business growth rather than merely sitting on shelves. At the same time, strengthening entrepreneurs' managerial and technical capabilities would improve their capacity to lead innovation projects effectively.
- Align IPR policy with sectoral development strategies. Intellectual property cannot exist in isolation. It should be integrated into broader national strategies for competitiveness, export promotion and industrial development. By integrating IPR considerations into these frameworks, we can create a more coherent policy environment where intellectual property directly contributes to economic diversification and industrial upgrading.
- Encourage commercialization and technology transfer. Policies should focus on stimulating the actual use of patents in production, not merely their registration. Support mechanisms for patent licensing and spin-offs can help transform research results into marketable products, effectively closing the persistent gap between invention and market application.

*Research limitations***.** This study has several limitations worth acknowledging. We focused predominantly on patents as the primary form of intellectual property, while other important forms (such as trade secrets) received less attention simply because reliable data is scarce. Another constraint is that the temporal scope of this study is restricted by data limitations, especially when it comes to enterprise-level innovation activities and R&D expenditure. We also recognize that our study does not examine how the main challenges related to intellectual property rights vary across different sectors, even though these challenges likely differ considerably from one industry to another.

Future research avenues. Future research can address these limitations in some significant ways. First, gathering primary data through survey and interview techniques from intellectual property professionals and enterprise managers would yield much more revealing information on what actually facilitates or hinders effective intellectual property management. Second, comparative studies with other Eastern European countries that faced analogous post-transition challenges can provide valuable lessons and best practices that could be adapted to the Moldovan context. Third, sectoral studies would allow for more targeted policy interventions since the requirements of information technology firms could differ from those in manufacturing or agriculture. Finally, studies of informal innovation activities and non-patent forms of knowledge protection would yield a more comprehensive picture of how Moldova's innovation system actually functions, beyond formal intellectual property mechanisms.

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