

A Comparative Study of Competencies of Future Management Accounting Professionals in Lithuania and Latvia Using a Multi-Criteria Model

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Abstract. Management accountants' high level of competence is essential for every company, as they manage a large amount of financial and non-financial information based on which managers make appropriate and timely decisions. However, the question arises as to whether the knowledge, skills and values of a management accountant, as referred to in the academic literature, are equally important in assessing such professionals' competence. Some elements are likely more important than others. This paper aims to identify the competencies required for a modern management accountant and quantify the importance of each competence element using a multi-criteria assessment approach. Such a multi-criteria model could be helpful for companies looking for management accountants to define the required level of competence, for management accountants and accounting students to assess their competencies and, if necessary, to improve the missing competencies. The study identified six competencies needed for a modern management accountant, among which the essential competencies identified by the experts were analytical skills and knowledge of corporate finance. Based on the experts' estimates, two multi-criteria models for assessing the competencies of a modern management accountant were developed and applied to evaluate the level of management accounting competencies of Lithuanian and Latvian accounting students.

Keywords: management accounting, competencies, multi-criteria model, Lithuania, Latvia.

JEL Code: M41, M53.

Introduction

A rapidly changing environment and the ongoing changes within it are driving companies to seek solutions that will help them maintain their competitiveness and achieve the desired performance results, making management accounting an increasingly important factor in ensuring the successful operation of the business. The importance of the competence of accounting professionals has been extensively studied by many researchers (Zhyvets, 2019; Beinarovica-Litvinova and Danilane, 2021; Cordos and Tiron-Tudor, 2023; Kazlauskaitė, 2024 etc.) but it should be noted that most of the time researchers have focused on the competence of professionals who manage financial accounting. However, accounting in companies is managed, and information is collected, processed, systematised and presented to users not only by specialists in financial accounting but also by specialists in management accounting. Their level of competence is much more important because these specialists manage much more financial and non-financial information on which managers need to make timely and appropriate decisions. As the role of the management accountant in the organisation evolves, these professionals need to maintain and continually improve their existing skills and acquire new ones to maintain their professionalism and credibility. The majority of conducted research (Birkett, 2002; Gray and Irons, 2016; Hamid et al., 2016; Rouwelaar et al., 2021; Mennati and Sasanian, 2022; Budding et al., 2022 etc.) is focused on assessing the level of skills or personal attributes already available, rather than on their current need. On the other hand, the question arises as to whether the knowledge, skills, abilities and personal qualities identified in the academic literature for a management accounting specialist are equally relevant in assessing the level of competence of these specialists. Some elements are likely to be more critical than others.

Therefore, the study aimed to reveal the importance of the knowledge, skills, abilities, and personal qualities needed by a modern management accounting specialist for their overall competence and, using the multi-criteria evaluation method, to quantitatively assess the significance of each element of competence. The developed multi-criteria model for assessing the competence of a modern management accounting specialist can be applied to various cases: (1) for organisations wishing to recruit management accountants, it would enable them to identify more accurately the knowledge, skills and personal attributes required; (2) for those already working in the field, it would enable them to assess their competence and, if necessary, develop the skills they lack; and (3) for accounting students, it would enable them to focus more on the skills, knowledge or attributes that are most relevant to them in the context of planning a career in management accounting. In addition, the results of the assessment of the level of competence of students could help universities to improve study programs and the curriculum of management accounting subjects.

A multi-criteria model for assessing the competence level of a modern management accountant was developed and applied to determine the competence level of accounting students. The choice to investigate the competencies of accounting students in Lithuania and Latvia was made because they are related countries in terms of their economic, social and cultural situation and are classified as emerging economies. The importance of assessing and comparing the competencies of management accountants in related countries was highlighted by Kral et al. (2021), who carried out a comparative analysis of the competencies and experience of management accountants in Poland and the Czech Republic. The authors point out that this type of research is important because, on the one hand, such countries share many similarities regarding company management due to their common historical, cultural and economic development. On the other hand, it may also reveal differences that may inspire ideas on improving these competencies.

The purpose of this research is to assess and compare the level of competence of future management accounting specialists studying at Lithuanian and Latvian universities, according to the prepared multi-criteria model for assessing the level of competence of a modern management accounting specialist.

1. Literature review

1.1 Management accountant competencies and their development

Like other professionals, management accountants need specific competencies to perform their job well and correctly. As Drisko (2014) points out, competence is the ability to perform a task effectively; it consists of three components - skills, knowledge and values. Skills are defined as the ability to do a task well; knowledge is acquired through learning, courses, work or practice and develops skills; values show how and why a professional applies his/her knowledge in different situations and are oriented towards the purpose of working in a particular profession.

The competencies required of management accountants have been analysed by academics and practitioners for some time. The International Federation of Accountants (IFAC, 2002) identified a set of competencies grouped into cognitive and behavioural skills essential for management accountants. The cognitive skills group included: 1) technical skills (communication, numeracy, computer literacy, accounting, financial management, planning and forecasting); 2) analytical/design skills (information literacy, research, analysis/problem structuring, planning); and 3) appreciative skills (discrimination, critique, responsiveness, value orientation, disciplinary perspective). The following skills have been classified as behavioural skills: 1) personal skills (inquisitiveness, balance, flexibility, straightforwardness, coping, intelligence, morality); 2) interpersonal skills (communication, people skills, team leadership), and 3) organisational skills (organisational awareness, value negotiation, network management, advocacy and representation, process management, project management, function management, organisational management).

In the same year, Birkett (2002) presented a detailed classification of management accountants' competencies regarding cognitive and behavioural groups and their constituent skills. It divides the individual competencies into five levels. This model was later simplified by Bots et al. (2009), who provided a list of management accounting competencies and their constituent skills without further subdividing them into levels 4 and 5 (see Table 1).

Table 1. Division of competencies required from management accountants

Level 1	Level 2	Level 3
Cognitive skills	Technical skills	Writing and understanding reports; computer literacy; accounting literacy; numeracy; financial strategising; processing non-financial data
	Analytical/design skills	Information literacy; research; analysis/problem structuring; planning; organizational design
	Appreciative skills	Discrimination; critique; responsiveness; value-oriented; disciplinary perspective; multi-disciplinary perspective
Behavioural skills	Personal skills	Morality, inquisitiveness; balance; flexibility; straightforwardness; ability to cope; intelligence
	Interpersonal skills	Communication (esp. oral); people skills; team leadership
	Organisational skills	Value negotiation; network management; advocacy and representation; process management; project management; function management; organisation management

Source: adapted from Bots et al. (2009), Birkett (2002)

Other researchers have also classified accountants' competencies into cognitive and behavioural (Howcroft, 2017; Tan and Laswad, 2018 etc.). Over time, however, some skills have become obsolete and less necessary in modern management accounting, while others have become more important and lead to more accurate and efficient management accounting decisions. Various changes - globalisation,

the expansion of international business networks, innovations in information technology, the rise of professional institutions, the growth of the academic profession, and the increasing and widespread use of management accounting in organisations - have led to changes in the competencies not only of management accounting itself but also of its practitioners (Wolf et al., 2020). The accelerating expansion of computer networks and the introduction of artificial intelligence into day-to-day financial and non-financial accounting processes require modern management accountants not only to be computer literate but also to master the new digital tools that are emerging (Bhimani and Willcocks, 2014). Roozen et al. (2019) argue that modern innovations such as cloud computing, process robotics, machine learning, artificial intelligence, the Internet of Things, big data and blockchain will dramatically change the finance function and place new demands on management accountants. The ever-increasing and expanding volume of data requires management accountants to become familiar with the data they analyse and use creatively. Critical thinking and insight remain important as the practitioner must be able to select relevant and meaningful information and avoid errors and bias. A study by Roozen et al. (2019) found that the most essential skills needed in modern management accounting must be continuously developed and are related to artificial intelligence, machine learning, and managing and understanding big data. According to Oesterreich and Teuteberg (2019), with the introduction of business intelligence information technology, management skills have become one of the most important skills a management accountant must use. In the future, the scope of work of the management accountant is expected to become similar to that of the data scientist, requiring strong data systematisation and mathematical-statistical skills, as well as business analytical skills.

It should be noted that the Institute of Management Accountants (IMA, 2022), in recognition of the changing role of the management accountant, has presented a competency model for management accountants consisting of six core competencies: strategy, planning and performance; reporting and control; business acumen and operations; technology and analytics; leadership; professional ethics and values.

1.2. A theoretical model for assessing the competence level of the modern management accountant

Thus, although Birkett's (2002) model of management accountants' competencies and their constituent skills is relevant and is still used in research on management accountants' competencies (Budding et al., 2022), it is appropriate to update it based on the competencies and the list of constituent skills proposed by the IMA (2022) and in light of the results of other research on the changing role of management accountants. Figure 1 shows the link between the competencies identified by Birkett (2002) and the IMA (2022) and the skills, knowledge and values that comprise them, which forms the basis of a theoretical model for assessing the level of competence of modern management accountants.

A comparison of the skills of management accountants, as presented by Birkett (2002) and the IMA (2022), suggests that interpersonal skills are of low relevance in the context of the competencies of a modern management accountant. However, there is a strong relationship with analytical skills, i.e., the importance of these skills remains. It should also be noted that the IMA (2022) competency model for management accountants includes new skills not identified by Birkett (2002), such as capital investment decisions and enterprise risk management. It is important to note that the importance of leadership, which Birkett (2002) identified as part of interpersonal skills, has increased. The IMA (2022) identified it as a separate competency relevant to the management accountant. The skills presented by the IMA (2022) are specific, modern and more knowledge-intensive. However, in line with the insights of Roozen et al. (2019) and Oesterreich and Teutberg (2019), it is appropriate to add artificial intelligence, big data and analytics skills in information technology management to the competencies of management accountants and the skills model that constitutes them.

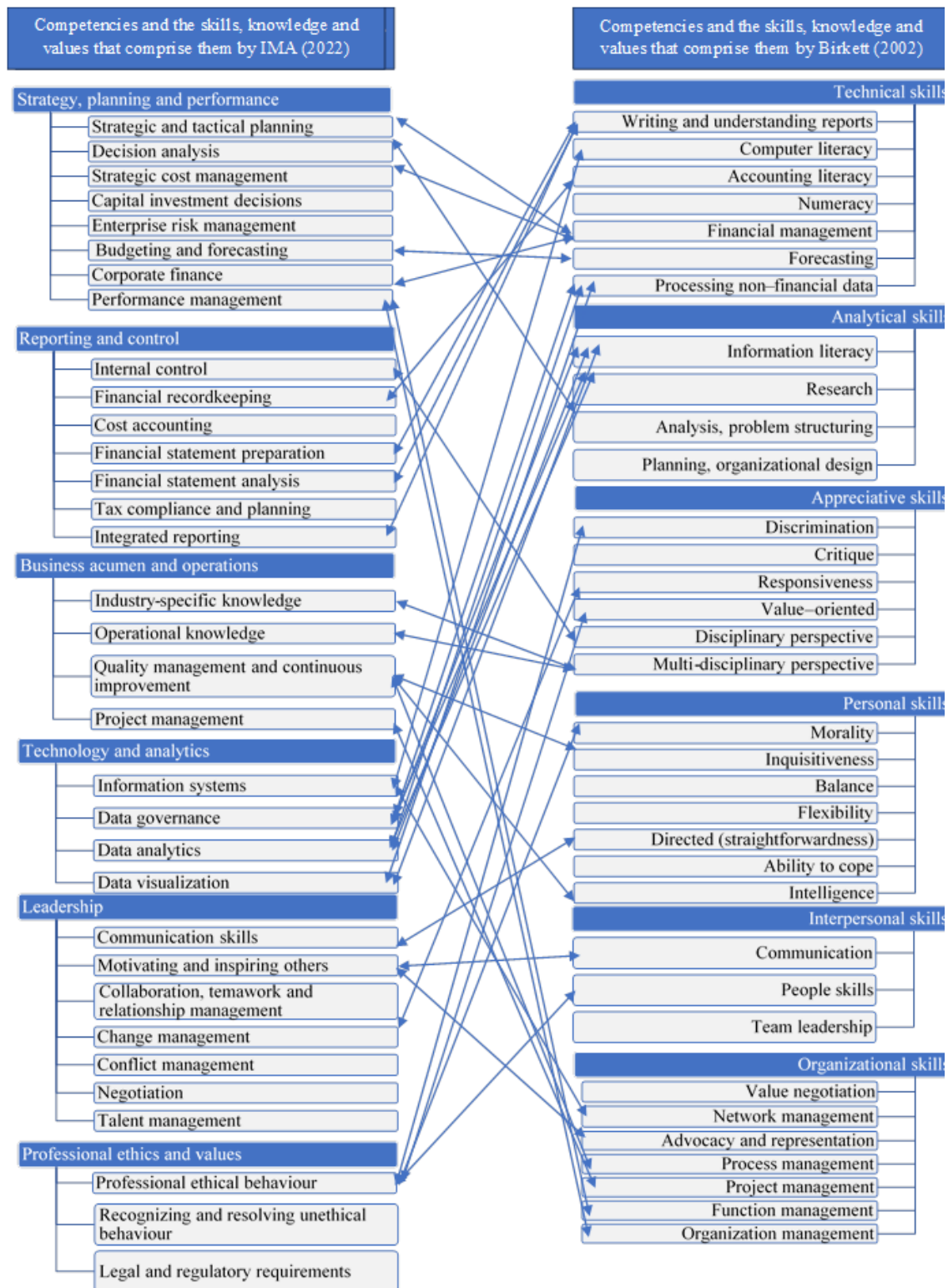


Fig. 1. Links between the competencies of management accountants and the skills, knowledge and values that comprise them, as presented by Birkett (2002) and IMA (2022)

Source: compiled by authors

Drawing on the links between Birkett's (2002) and the IMA's (2022) competency models for management accountants, shown in Figure 1, as well as insights from other research, a theoretical model of the competencies of the modern management accountant and the skills, knowledge and values that comprise these competencies has been developed (see Figure 2). It proposes to include six competencies: 1) technical skills, 2) corporate finance knowledge, 3) analytical skills, 4) assessment skills, 5) leadership, and 6) professional ethics and values. Each competency consists of specific skills, knowledge and values that enable the professional to demonstrate the competence acquired and perform well in management accounting roles.

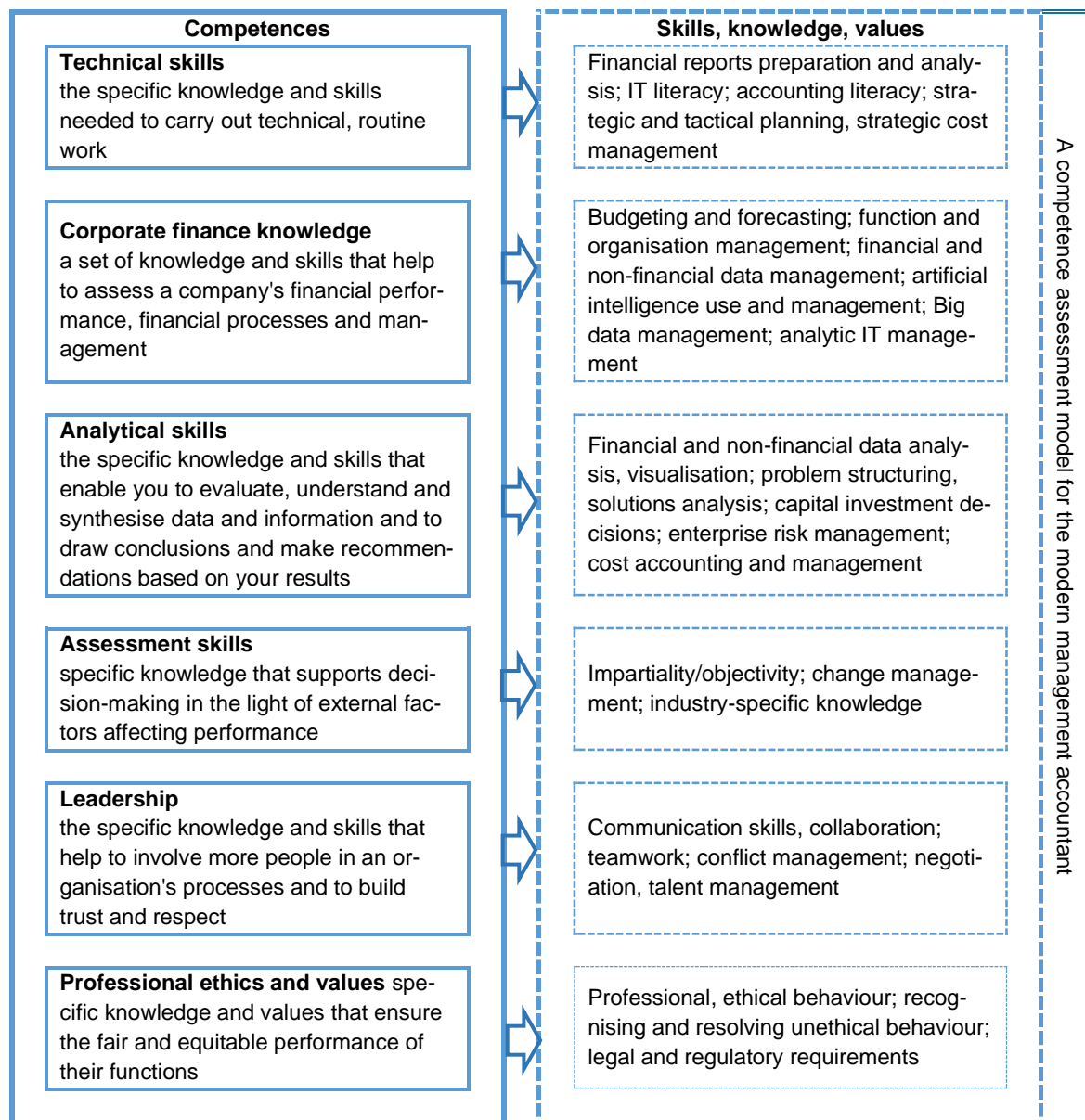


Fig. 2. A theoretical model for assessing the competence level of the modern management accountant

Source: compiled by authors

The theoretical model developed to assess the level of competence of a modern management accountant only elaborates on the general competencies, the skills, knowledge and values that make

them up but does not enable the assessment of the level of competence possessed or acquired by the professional. In order to assess the importance of each competency and the skills, knowledge and values that comprise them in assessing the level of competence of a modern management accountant, an empirical study was carried out to determine the weights of the elements of the model using multi-criteria estimation.

2. Methodology

2.1 The research problem

The relevance of the level of competencies in each field of activity, in each profession, in one context or another, has been the subject of scientific research. An analysis of the academic literature shows that the issue of the importance of the competencies of management accountants has been addressed in a fragmented way, with many studies focusing on assessing the level of skills, knowledge and values already acquired but not on the current need for them. The study asks whether the knowledge, skills and values of a management accountant, as identified in the academic literature, are equally important in assessing the competence of management accountants. Some elements are likely to be more critical than others. Therefore, the study sought to identify the importance of the knowledge, skills, and values required by modern management accountant in their overall competence and to quantify the importance of each competence element using a multi-criteria scoring method. Based on the results, multi-criteria models for the assessment of the competence level of a modern management accountant have been developed.

To assess the suitability of the developed model, the level of management accounting competence of Lithuanian and Latvian university students specialising in accounting was determined. These countries were chosen because they are related countries in terms of their economic, social and cultural situation and are classified as emerging economies. Vilnius University and the University of Latvia were selected for the study because they are the country's largest and most important universities, preparing top-quality professionals for the national market. The results of the comparative study will allow us not only to determine the level of management accounting competencies acquired but also to identify the reasons for the gaps in students' skills, knowledge and values and to find ways to fill them.

2.2 Study design and methods

The empirical study consists of two stages: (1) the first stage is aimed at weighting the competencies and their constituent skills, knowledge and values identified in the theoretical model of management accounting competencies, thus forming multi-criteria assessment models; (2) the second stage is aimed at applying the formed multi-criteria model for assessing the level of competence of a modern management accounting specialist in determining the level of management accounting competence of accounting students studying accounting in Lithuania and Latvia.

In order to develop a multi-criteria model for assessing the competencies of a modern management accountant, it is first necessary to identify the importance of each competency and its constituent elements in the overall assessment of the professional. According to Podvezko and Podvezko (2014), one of the most important parts of multi-criteria evaluation methods is the weighting of criteria, as individual criteria describing the object under study have different impacts on the objective. For this reason, determining the significance of the criteria - the weights- is important. For this purpose, an expert evaluation method using a questionnaire survey was chosen. The choice of this method is based on the fact that all the methods for weighting the multi-criteria factors are based on the opinion of experts (Ginevičius, 2006). As Žvirblis and Igotas (2013) point out, there are many methods of multi-criteria evaluation: Geometric Mean Method, Simple Additive Weighting (SAW), Sum of Units Method, Weighted Sum Approach (WSA), Analytic Hierarchy Process (AHP), Fuzzy Logic Method, Technique for Order of Preference by Similarity to Ideal Solution (TOPSIS). The Simple Additive Weighting (SAW) method was chosen for this study because it best describes the meaning of a multi-criteria assessment (Ginevičius and Podvezko, 2008). A group of experts was set up to conduct the study, and a sample of

experts and their selection criteria were defined. The scientific literature does not clearly define the number of experts needed to conduct reliable studies. Tidikis (2003) states that a group of 5-7 people is optimal. Augustinaitis et al. (2009) also recommend including at least five experts in the expert group, so a sample of 5 experts was selected for the study. The criteria for selecting experts are as follows: (1) a practitioner with at least 5 years experience in a managerial position in financial or management accounting shall be considered an expert; (2) a practitioner with a master's degree in financial or management accounting (or a related discipline) shall be considered an expert. The expert evaluation is based on non-probability sampling methods, as experts are selected according to a set of criteria rather than at random. For the study, a non-probabilistic convenience sampling method was chosen, where the most accessible participants were included. Based on the established selection criteria, five experts were selected.

An expert evaluation questionnaire was then developed. The questionnaire consists of two sets of questions. The first group consisted of a single question designed to assess the relevance of each management accounting competency. The second group consisted of six questions designed to assess the relevance of the management accountant's skills, knowledge and values to the specific competence. Experts were asked to rank in order of importance the competencies and the skills, knowledge and values that make up the competencies that management accountants need to manage and perform management accounting tasks more effectively. The Kendall's concordance coefficient was used to assess the consistency of the experts' opinions. The closer the experts' opinions agree, the closer the coefficient is to 1. If there is no agreement, the coefficient is 0. The following hypotheses are proposed:

H0: The experts' evaluations are inconsistent (i.e., the concordance coefficient equals zero);

HA: The experts' evaluations are consistent (i.e., the concordance coefficient does not equal zero).

Podvezko (2005) suggests the additional application of the χ^2 test to provide a more precise and justified assessment of concordance. If the χ^2 test value exceeds the critical value χ^2_{cr} , the null hypothesis (H0) is rejected, indicating that the experts' evaluations are consistent. The critical value χ^2_{cr} can be found in the statistical tables.

After assessing the consistency of the experts' views, the data collected was further processed and analysed using a multi-criteria assessment. In order to find the meaning of the multi-criteria assessment, the values obtained for the indicators have to be transformed. The purpose of reordering is to assign weights in descending order of rank, i.e. the highest value is assigned to the first rank. The linear transformation of the scores, which provides the most accurate result, is performed according to the formula (Podvezko and Podvezko, 2014):

$$\omega_i = \frac{\sum_{k=1}^r (m+1-c_{ik})}{\sum_{i=1}^m \sum_{k=1}^r (m+1-c_{ik})} ; \quad (1)$$

where m is the number of criteria, r is the number of experts involved, and c_{ik} is the post-ranking score. For the direct ranking method, the sum of the c_{ik} of the total scores of each expert must be equal to 1.

Based on the results of the first stage of the study, two multi-criteria models were developed to assess the level of competence of a modern management accountant. The first model is designed to assess management accounting competencies by assigning a calculated weight to each. The second model is broader and breaks down the competencies into skills, knowledge and values, which are also given calculated weights.

In the second stage of the study, the two multi-criteria models for assessing the level of competence of a modern management accountant were applied to determine the level of competence in management accounting of accounting students studying at Vilnius University and University of Latvia. Study population: 3rd and 4th year accounting students at Vilnius University and 4th year accounting students at the University of Latvia. 45 Lithuanian and 40 Latvian students participated in the survey. The number

of respondents ensures the required sample size, calculated according to the Paniotas formula with a margin of error of 9%. The survey was conducted using a questionnaire. The questionnaire consisted of 3 demographic questions about the student's course, work experience and gender. This was followed by questions asking students to indicate how they perceived the competencies, skills, knowledge and values acquired during their studies in management accounting. The students were given the same list of competencies and the skills, knowledge and values that make up each of them as the experts. They were asked to rate the competencies on a Likert scale, with 1 being very weak and 5 being very strong.

3. Results of the research

3.1 Results of the expert evaluation

The empirical study started with an expert evaluation to determine the importance of the competencies identified in the theoretical model for assessing management accountants' competence level and the skills, knowledge and values that make up the competencies.

In the first question of the expert evaluation questionnaire, the experts were asked to rank the competencies of a management accountant in order of importance, with 1 being the most important and 6 being the least important. The results of the experts' responses to this question are presented in Table 2. It shows that the most important competencies identified by the experts were analytical skills (mean=1.4) and knowledge of corporate finance (mean=1.8). According to the experts, leadership (mean=5.6) and professional ethics and values (mean=5.2) are the least important competencies.

Table 2. The results of the expert's evaluation of the importance of the competencies of the management accountant

Competencies	E1	E2	E3	E4	E5	Mean	Mode
Technical skills	3	3	3	4	2	3.00	3
Corporate finance knowledge	1	2	1	2	3	1.80	1; 2
Analytical skills	2	1	2	1	1	1.40	1
Assessment skills	4	4	5	3	4	4.00	4
Leadership	5	6	6	5	6	5.60	6
Professional ethics and values	6	5	4	6	5	5.20	6; 5

Source: compiled by authors

The experts were then asked to rank the skills, knowledge, and values identified for each competency in Table 2. Table 3 shows the experts' views on the importance of the skills, knowledge and values attributed to the technical competence, corporate finance knowledge and analytical skills competencies. As shown in Table 3, in the area of technical skills, the experts indicated that the most important skill for today's management accountant is IT literacy (mean=1.20); in the area of corporate finance knowledge, budgeting and forecasting (mean=1.40); and in the area of analytical skills, analysis and visualisation of financial and non-financial data (mean=1.60). The least important skills in each competency were accounting literacy, using and managing artificial intelligence, and capital investment decisions.

Table 3. The results of the expert's evaluation of the importance of management accountants' skills, knowledge and values in terms of technical skills, corporate finance knowledge and analytical skills

	E1	E2	E3	E4	E5	Mean	Mode
Q2. Rank the skills, knowledge and values attributed to the technical skills competency in order of importance to assess the level of competence of the management accountant (where 1 is most important; 4 is least important):							
Financial reports preparation and analysis	2	2	2	3	1	2.25	2
IT literacy	1	1	1	1	2	1.20	1

Accounting literacy	4	4	3	4	3	3.60	4
Strategic and tactical planning, strategic cost management	3	3	4	2	4	3.20	3; 4
<i>Q3. Rank the skills, knowledge and values attributed to the corporate finance knowledge competency in order of importance to assess the level of competence of the management accountant (where 1 is most important; 6 is least important):</i>							
Budgeting and forecasting	2	2	1	1	1	1.40	1
Function and organisation management	1	1	2	6	2	2.40	1; 2
Financial and non-financial data management	3	6	3	3	4	3.80	3
Artificial intelligence use and management	6	5	6	4	5	5.20	6; 5
Big data management	5	3	5	5	3	4.20	5
Analytic IT management	4	4	4	2	6	4.00	4
<i>Q4. Rank the skills, knowledge and values attributed to the analytical skills competency in order of importance to assess the level of competence of the management accountant (where 1 is most important; 5 is least important):</i>							
Financial and non-financial data analysis, visualisation	3	1	2	1	1	1.60	1
Problem structuring, solutions analysis	2	3	3	2	3	2.60	3
Capital investment decisions	4	5	5	5	5	4.80	5
Enterprise risk management	1	2	1	3	4	2.20	1
Cost accounting and management	5	4	4	4	2	3.80	4

Source: compiled by authors

Table 4 shows the experts' ratings of the skills, knowledge and values attributed to the competencies of assessment skills, leadership and professional ethics and values. The most important skills are change management, communication skills and collaboration, and professional ethical behaviour, while the least important are impartiality/objectivity, negotiation and talent management, and compliance with legal and regulatory requirements.

Table 4. **The results of the expert's evaluation of the importance of management accountants' skills, knowledge and values in terms of technical skills, corporate finance knowledge and analytical skills**

	E1	E2	E3	E4	E5	Mean	Mode
<i>Q5. Rank the skills, knowledge and values attributed to the assessment skills competency in order of importance to assess the level of competence of the management accountant (where 1 is most important; 3 is least important):</i>							
Impartiality/objectivity	3	3	3	3	3	3.00	3
Change management	1	1	2	1	1	1.20	1
Industry-specific knowledge	2	2	1	2	2	1.80	2
<i>Q6. Rank the skills, knowledge and values attributed to the leadership competency in order of importance to assess the level of competence of the management accountant (where 1 is most important; 4 is least important):</i>							
Communication skills, collaboration	1	1	2	1	1	1.20	1
Teamwork	2	2	1	3	3	2.20	2
Conflict management	3	4	4	2	2	3.00	4; 2
Negotiation, talent management	4	3	3	4	4	3.60	4
<i>Q7. Rank the skills, knowledge and values attributed to the professional ethics and values competency in order of importance to assess the level of competence of the management accountant (where 1 is most important; 3 is least important):</i>							
Professional ethical behaviour	1	1	1	1	1	1.00	1
Recognising and resolving unethical behaviour	2	2	3	3	2	2.40	2
Legal and regulatory requirements	3	3	2	2	3	2.60	3

Source: compiled by authors

The assessment of the consistency of the experts' opinions using the concordance coefficient and the χ^2 showed that the experts' views are consistent. Therefore, the results can be used to develop multi-criteria competency level models for the modern management accountant (see Table 5).

Table 5. Values for the consistency of expert opinions

Question number	W (concordance coefficient)	χ^2 (Chi-square)	Critical value if significance level = 0.05	Consistency of opinions
1.	0.86	21.57	11.07	Opinions are consistent
2.	0.73	10.92	7.82	Opinions are consistent
3.	0.53	13.34	11.07	Opinions are consistent
4.	0.66	13.28	9.49	Opinions are consistent
5.	0.84	8.40	5.99	Opinions are consistent
6.	0.65	9.72	7.82	Opinions are consistent
7.	0.84	8.40	5.99	Opinions are consistent

Source: compiled by authors

3.2 Developing multi-criteria assessment models for the modern management accountant

Once the consistency of the experts' opinions was confirmed, the resulting values were reordered and transformed. Table 6 shows the reordered and transformed values of the responses to the first question of the expert evaluation questionnaire. The reordering procedure was carried out by giving the highest score 6 the lowest weight of 1, score 5 the lowest weight of 2 and so on. The values were transformed by dividing the resulting transformed value by the sum of all the expert's estimates (21). A similar procedure was applied to the experts' responses to the other questions in the questionnaire. The transformed values were used to assign weights to each competency and its constituent skills, knowledge and values. The overall scores were calculated from the averages of the experts' transformed values.

Table 6. Estimates, reordered and transformed values of the experts' answers to question 1 of the questionnaire

Expert	Type of assessment	Competences of a modern management accountant					
		Technical skills	Corporate finance knowledge	Analytical skills	Assessment skills	Leadership	Professional ethics and values
E 1	Estimate	3	1	2	4	5	6
	Reordered value	4	6	5	3	2	1
	Transformed value	0.19	0.29	0.24	0.14	0.10	0.05
E 2	Estimate	3	2	1	4	6	5
	Reordered value	4	5	6	3	1	2
	Transformed value	0.19	0.24	0.29	0.14	0.05	0.10
E 3	Estimate	3	1	2	5	6	4
	Reordered value	4	6	5	2	1	3
	Transformed value	0.19	0.29	0.24	0.10	0.05	0.14

E4	Estimate	4	2	1	3	5	6
	Reordered value	3	5	6	4	2	1
	Transformed value	0.14	0.24	0.29	0.19	0.10	0.05
E5	Estimate	2	3	1	4	6	5
	Reordered value	5	4	6	3	1	2
	Transformed value	0.24	0.19	0.29	0.14	0.05	0.10

Source: compiled by authors

After determining the position (rank) of each competency and the specific skill within that competency and converting them into their respective weights, two multi-criteria competency level assessment models for the modern management accountant were developed: 1) including only the generic competencies in the model; and 2) including all the skills, knowledge and values for each competency. Table 7 shows the calculated competency weights and the overall weights identified by each expert, which are the indicators of the first model.

Table 7. A model for assessing the competencies of the modern management accountant

Competencies	Weight, W_i					Total weight, W_i (average)
	E1	E2	E3	E4	E5	
Technical skills	0.19	0.19	0.19	0.14	0.24	0.19
Corporate finance knowledge	0.29	0.24	0.29	0.24	0.19	0.25
Analytical skills	0.24	0.29	0.24	0.29	0.29	0.27
Assessment skills	0.14	0.14	0.10	0.19	0.14	0.14
Leadership	0.10	0.05	0.05	0.10	0,05	0.07
Professional ethics and values	0.05	0.10	0.14	0.05	0,10	0.09
Total	1	1	1	1	1	1

Source: compiled by authors

As seen in Table 7, the most influential factors in assessing the level of competence of a modern management accountant are competence in analytical skills (0.27) and knowledge of corporate finance (0.25). According to the experts, the least influential factors on a management accountant's competence level are leadership (0.07) and professional ethics and values (0.09). A second model was then developed based on the experts' estimates for questions 2-7 of the questionnaire and the results of the reordered and transformed values. This elaborates on the first model regarding the skills, knowledge and values attributed to each competence (see Table 8).

Table 8. A model for assessing the skills, knowledge and values of the modern management accountant

Competencies	Skills, knowledge and values	Wight, W_i					Mean	Total weight, W_i (average) adjusted by competences
		E1	E2	E3	E4	E5		
Technical skills	Financial reports preparation and analysis	0.30	0.30	0.30	0.20	0.40	0.30	0.057
	IT literacy	0.40	0.40	0.40	0.40	0.30	0.38	0.072
	Accounting literacy	0.10	0.10	0.20	0.10	0.20	0.14	0.027
	Strategic and tactical planning, strategic cost management	0.20	0.20	0.10	0.30	0.10	0.18	0.034
Total		1.00	1.00	1.00	1.00	1.00	1.00	

Corporate finance knowledge	Budgeting and forecasting	0.24	0.24	0.29	0.29	0.29	0.27	0.066
	Function and organisation management	0.29	0.29	0.24	0.05	0.24	0.22	0.054
	Financial and non-financial data management	0.19	0.05	0.19	0.19	0.14	0.15	0.038
	Artificial intelligence use and management	0.05	0.10	0.05	0.14	0.10	0.09	0.021
	Big data management	0.10	0.19	0.10	0.10	0.19	0.13	0.033
	Analytic IT management	0.14	0.14	0.14	0.24	0.05	0.14	0.035
	Total	1.00	1.00	1.00	1.00	1.00	1.00	
Analytical skills	Financial and non-financial data analysis, visualisation	0.20	0.33	0.27	0.33	0.33	0.29	0.078
	Problem structuring, solutions analysis	0.27	0.20	0.20	0.27	0.20	0.23	0.060
	Capital investment decisions	0.13	0.07	0.07	0.07	0.07	0.08	0.021
	Enterprise risk management	0.33	0.27	0.33	0.20	0.13	0.25	0.068
	Cost accounting and management	0.07	0.13	0.13	0.13	0.27	0.15	0.039
	Total	1.00	1.00	1.00	1.00	1.00	1.00	
Assessment skills	Impartiality/objectivity	0.17	0.17	0.17	0.17	0.17	0.17	0.024
	Change management	0.50	0.50	0.33	0.50	0.50	0.47	0.067
	Industry-specific knowledge	0.33	0.33	0.50	0.33	0.33	0.37	0.052
	Total	1.00	1.00	1.00	1.00	1.00	1.00	
Leadership	Communication skills, collaboration	0.40	0.40	0.30	0.40	0.40	0.38	0.025
	Teamwork	0.30	0.30	0.40	0.20	0.20	0.28	0.019
	Conflict management	0.20	0.10	0.10	0.30	0.30	0.20	0.013
	Negotiation, talent management	0.10	0.20	0.20	0.10	0.10	0.14	0.009
	Total	1.00	1.00	1.00	1.00	1.00	1.00	
Professional ethics and values	Professional ethical behaviour	0.50	0.50	0.50	0.50	0.50	0.50	0.043
	Recognising and resolving unethical behaviour	0.33	0.33	0.17	0.17	0.33	0.27	0.023
	Legal and regulatory requirements	0.17	0.17	0.33	0.33	0.17	0.23	0.020
	Total	1.00	1.00	1.00	1.00	1.00	1.00	1.000

Source: compiled by authors

As seen in Table 8, financial reporting (0.3) and information technology (0.38) skills have the most significant impact on the technical skills competencies. These skills weigh 0.057 and 0.072, respectively, in the overall competence level of the accountant. Accounting literacy has the most negligible impact on technical skills competence, with a weight of 0.14 and 0.034 in the overall competence score. Corporate finance knowledge skills are heavily weighted towards budgeting and forecasting (0.27) and managing functions and organisations (0.22). Accordingly, when assessing a management accountant's overall competence level, these skills lead to estimates of 0.066 and 0.054. According to the experts, the most essential skills for analytical competence are the analysis and visualisation of financial and non-financial data (0.29), problem structuring, solutions analysis (0.23) and enterprise risk management (0.25). These skills are also among the most significant in terms of the overall competence of a modern management accountant, leading to competence scores of 0.078, 0.06 and 0.068, respectively. Almost half of the assessment skills competency evaluation is influenced by change management (0.47), while impartiality has the lowest impact (0.17). Experts consider that leadership is the least influential competency in the overall management accountant competency set, with communication and collaboration skills having the highest weight (0.38) and negotiation and talent

management skills the lowest (0.14). In the professional ethics and values competence, the experts consider that half of the score is due to professional ethical behaviour (0.5), contributing 0.043 to the overall competence score. Recognising and eliminating unethical behaviour (0.27) and complying with legal requirements (0.23) is also crucial in the comprehensive evaluation of the competence of a modern management accountant, with scores of 0.023 and 0.02, respectively.

Summarising the results of the expert evaluation, which resulted in two multi-criteria competency level assessment models for the modern management accountant, the experts consider the essential competencies for the modern management accountant to be analytical and corporate finance knowledge skills such as budgeting and forecasting, function and organisation management, financial and non-financial data analysis, visualisation, problem structuring, solution analysis and enterprise risk management, which together contribute 0.326 to the overall competency level. The least influential competencies are leadership and professional ethics and values, with skills, knowledge and values such as teamwork, conflict management, negotiation and talent management, and regulatory requirements compliance contributing 0.061 to the overall competencies of a modern management accountant.

3.3 Application of the multi-criteria model to assess management accountant competencies for Lithuanian and Latvian students

As mentioned above, the multi-criteria models of management accountant competencies can be applied in various contexts, including assessing accounting students' skills, knowledge and values in management accounting. The models have been used to determine the level of management accounting competencies of Lithuanian and Latvian students studying at the largest universities in the country.

The survey was conducted among 45 students from Vilnius University and 40 from a Latvian university studying an accounting programme. Of these, 16 were third-year students, and 69 were fourth-year students. More than 90% of the respondents were female. The work experience of the respondents showed that Latvian students had more work experience than Lithuanian students. Only one Latvian student respondent indicated that he/she had no work experience, while 5 Lithuanian students showed the same. 27 Latvian students and only 9 Lithuanian students stated they had more than 2 years of work experience. Both work experience and year of study can determine the strength of the skills acquired.

The questionnaire asked respondents to indicate the strength of their competencies, skills, knowledge, and values acquired during their studies in management accounting. Table 9, which shows the assessment results of the competencies, reveals that Latvian students rate their competencies better than Lithuanian students. The overall level score of competence for Latvian students is 4.08, while for Lithuanian students it is 3.36. The most significant gap is observed in the analytical skills competence. It is important to note that this competency is the most important in assessing a management accountant's overall level of competence and, therefore, has the most significant impact on the assessment of analytical skills. The data in Table 9 show that students in both countries have the same score for competence in professional ethics and values, with a calculated score of 0.34. When analysing the overall scores, without applying weighting factors, the Lithuanian students' assessment of leadership competence stands out the most, with a score of 2.77 out of a possible 5, indicating that this indicator does not even reach the average competence level.

Table 9. Assessment of the level of competence of Lithuanian and Latvian students in management accounting

Competencies	LT	LV	Wight, W _i	Score	
	Mean	Mean		LT	LV
Technical skills	3.38	4.00	0.19	0.64	0.76
Corporate finance knowledge	3.26	4.00	0.25	0.81	0.99
Analytical skills	3.32	4.38	0.27	0.89	1.17
Assessment skills	3.52	3.97	0.14	0.50	0.57
Leadership	2.77	3.88	0.07	0.18	0.26
Professional ethics and values	3.95	3.92	0.09	0.34	0.34
Total score	20.19	24.15	1.00	3.36	4.08
Maximum score	30.00	30.00	1.00	5.00	5.00

Source: compiled by authors

An analysis of students' self-assessment of their skills, knowledge and values in the areas of technical skills, corporate finance knowledge and analytical skills shows that students at the University of Latvia rated their skills higher in each criterion, except for the use of artificial intelligence, where the score was the same at 0.08 (see Table 10). Students at both universities also rated their IT management skills almost identically.

Table 10. Assessment of the level of skills, knowledge and values of Lithuanian and Latvian students in the competencies of technical skills, knowledge of corporate finance and analytical skills

Skills, knowledge and values	LT	LV	Wight, W _i	Score	
	Mean	Mean		LT	LV
<i>Technical skills</i>					
Financial reports preparation and analysis	2.88	4.38	0.057	0.16	0.25
IT literacy	3.81	3.95	0.072	0.28	0.29
Accounting literacy	3.39	4.55	0.027	0.09	0.12
Strategic and tactical planning, strategic cost management	2.87	3.83	0.034	0.10	0.13
Total score	12.95	16.71	0.19	0.63	0.79
Maximum score	20.00	20.00	0.19	0.95	0.95
<i>Corporate finance knowledge</i>					
Budgeting and forecasting	2.74	4.05	0.066	0.18	0.27
Function and organisation management	2.69	3.65	0.054	0.15	0.20
Financial and non-financial data management	3.25	3.88	0.038	0.12	0.15
Artificial intelligence use and management	3.57	3.55	0.021	0.08	0.08
Big data management	2.90	3.78	0.033	0.10	0.12
Analytic IT management	2.95	3.75	0.035	0.10	0.13
Total score	18.10	22.66	0.25	0.73	0.94
Maximum score	30.00	30.00	0.25	1.24	1.24
<i>Analytical skills</i>					
Financial and non-financial data analysis, visualisation	3.42	4.03	0.078	0.27	0.32
Problem structuring, solutions analysis	3.09	3.88	0.060	0.19	0.23
Capital investment decisions	2.05	3.85	0.021	0.04	0.08
Enterprise risk management	2.67	3.93	0.068	0.18	0.27
Cost accounting and management	3.29	4.28	0.039	0.13	0.17
Total score	14.52	19.97	0.27	0.81	1.06
Maximum score	25.00	25.00	0.27	1.33	1.33

Source: compiled by authors

An analysis of how students self-assessed their skills, knowledge, and values in assessment skills, leadership, and professional ethics shows no significant difference between the assessments. Students from the University of Latvia rate themselves slightly higher in change management, industry-specific knowledge, negotiation, and talent management. Meanwhile, Lithuanian students are more optimistic about their skills, knowledge, and values regarding impartiality and professional ethics.

Table 11. Assessment of the level of skills, knowledge and values of Lithuanian and Latvian students in the competencies of assessment skills, leadership and professional ethics and values

Skills, knowledge and values	LT	LV	Wight, W _i	Score	
	Mean	Mean		LT	LV
<i>Assessment skills</i>					
Impartiality/objectivity	4.19	3.85	0.024	0.10	0.09
Change management	3.14	3.68	0.067	0.21	0.25
Industry-specific knowledge	3.23	4.00	0.052	0.17	0.21
Total score	10.57	11.53	0.14	0.48	0.55
Maximum score	15.00	15.00	0.14	0.72	0.72
<i>Leadership</i>					
Communication skills, collaboration	4.03	4.10	0.025	0.10	0.10
Teamwork	4.17	4.30	0.019	0.08	0.08
Conflict management	3.56	3.95	0.013	0.05	0.05
Negotiation, talent management	2.95	3.85	0.009	0.03	0.04
Total score	14.71	16.20	0.07	0.25	0.27
Maximum score	20.00	20.00	0.07	0.33	0.33
<i>Professional ethics and values</i>					
Professional ethical behaviour	4.43	4.05	0.043	0.19	0.17
Recognising and resolving unethical behaviour	3.96	4.13	0.023	0.09	0.09
Legal and regulatory requirements	3.91	3.83	0.020	0.08	0.08
Total score	12.30	12.01	0.09	0.36	0.34
Maximum score	15.00	15.00	0.09	0.43	0.43

Source: compiled by authors

In conclusion, the assessment of management accounting competencies of Lithuanian and Latvian students according to each competence group using a multi-criteria model showed a significant gap between students from these countries in the areas of technical skills, knowledge of corporate finance and analytical skills.

Conclusions and recommendations

1. A management accountant must have a wide range of knowledge and skills to fulfil his/her role. The scientific literature identifies a range of competencies required for successfully keeping management accounting. However, it is essential to note that the responsibilities of management accountants have evolved, with some competencies becoming less critical and others becoming significantly more important. It was, therefore, important to identify the knowledge, skills and values essential for the modern management accountant. The scientific literature identifies a range of competencies required for management accountants. Based on the competencies identified by Birkett (2002) and IMA (2022) and others, a theoretical model was developed of the competencies required for a modern management accountant, which consists of six competencies: 1) technical skills, 2) corporate finance knowledge, 3) analytical skills, 4) assessment skills, 5) leadership, and 6) professional ethics and values. Each competency includes specific skills, knowledge, and values that enable the practitioner to perform well in management accounting tasks and demonstrate competence. This model allows companies to specify the requirements for future management accountants while existing professionals can assess their acquired competencies and improve them where necessary.

2. The competency model developed for the modern management accountant represents a standard set of knowledge, skills and values required to keep management accounting properly. However, the identified competencies are not equally relevant. Therefore, to assess the overall level of competence of the management accountant, the significance of each element of the model was determined. Based on the experts' opinion, the theoretical model for assessing the level of competence of a modern management accountant has been supplemented by the weighting of the competencies and the component skills, knowledge and values using a multi-criterion scoring method. Two multi-criteria assessment models were developed: (1) where the weights of significance were assigned to the six

competencies identified; (2) where the weights of significance were assigned to the knowledge, skills and values of each competence. Experts consider analytical skills and corporate finance knowledge to be critical competencies. These competencies account for half the weight of the skills, knowledge and values required for a modern management accountant in the overall competency assessment model. The results show that leadership, professional ethics and values have the least significant impact on the overall competence of a modern management accountant.

3. The multi-criteria models developed to assess the competencies of a modern management accounting professional were applied to determine the management accounting competencies acquired by Lithuanian and Latvian students. The study revealed that Latvian students' competencies in management accounting are higher in all competencies, except for the competence of professional ethics and values, which both Lithuanian and Latvian students equally rated. When assessing the knowledge, skills and values attributed to each competency, it was found that Latvian students rated themselves higher in almost all items except for the skills of impartiality and professional ethical behaviour. However, while this survey has only revealed trends, further research is needed to understand the reasons for the gap by analysing work experience and course responses. It would also be helpful to compare programmes, modules and topics covered. This would identify the reasons for the lack of management accounting skills, knowledge, and values and the means to improve them.

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