

- принцип постепенности изменений, означающий комплексное использование природных ресурсов, использование отходов как сырья;
- принцип территориальности, т. е. разработка территориальных, а не отраслевых программ и проектов, способствующих развитию экологизации производства, что позволит комплексно решать существующие экологические проблемы.

Следовательно, главной целью экологизации производства следует считать достижение определенного экономического роста, не увеличивая нагрузку на окружающую среду на основе современной технологической базы при реализации эколого-экономической эффективности производственной деятельности. Таким образом, экологизация производственной сферы должна быть обоснована экономически, а результаты ее должны иметь рынки сбыта, достигая при этом поставленные социальные и экологические цели.

Сочетание более строгих экологических стандартов способствует предупреждению загрязнений как основе системной экологизации производственной сферы. К данным экологическим стандартам можно отнести экологические требования потребителей, признание обществом приоритетности экологического императива, стандарты благосостояния и др.

Анализируя данную проблему, можно выделить соответствующие направления предупреждения ухудшения экологической ситуации и сбережения природных ресурсов:

- рациональное ведение хозяйства, способствующее максимальной эффективности использования ресурсов, не допуская утечек и перерасхода сырья;
- заменимость материалов, позволяющих избежать использования опасного сырья, например тяжелых металлов;
- модернизация производства для достижения большей экологичности;
- экономически рациональное потребление ресурсов, когда экономическая рациональность есть основа, в соответствии с которой отходы отличаются от сырья.

В свою очередь, последние из приведенных двух направлений определяют создание производственных экосистем, в рамках которых отходы одного производственного процесса становятся сырьем другого, а практическая реализация соответствующих направлений возможна через разработку и создание проектов экологизации.

Таким образом, развитие и совершенствование экологизации хозяйственной деятельности в настоящее время является неотъемлемым постулатом механизма природоохранной деятельности и требует к себе особого внимания. Сформировавшиеся в современном мире задачи и принципы экологизации организуют своего рода

меры по предупреждению, которые являются основным элементом развития концепции устойчивого развития в сфере экологии.

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IFRS ADOPTION. EVIDENCES FROM ITALIAN COMPANIES

ПРИНЯТИЕ МЕЖДУНАРОДНЫХ СТАНДАРТОВ ФИНАНСОВОЙ ОТЧЕТНОСТИ (НА ПРИМЕРЕ ИТАЛЬЯНСКИХ КОМПАНИЙ)

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С 2005 г. принудительное принятие МСФО для всех листинговых компаний стимулировало значительные изменения, которые включают не только технические детали о признании, измерении и раскрытии отчетных данных, но также влекут за собой культурную революцию в традиции ведения бухгалтерского учета Италии, которая развивалась более 100 лет. Результаты исследования свидетельствуют о том, что финансовая отчетность, соответствующая МСФО, не ведет к улучшению открытости данных компании; приводит к существованию «двойной колеи» в процессе обработки данных, которые ведут к разделению внешней от внутренней от-

четности. А также расходы на составление финансовой отчетности превышают выгоды от ее ценности для пользователей. Принятие МСФО ведет к усложнению принятия управленческих решений. Возможно, решением поставленных задач станет широкое применение XBRL (расширенный язык бизнес-отчетов).

Nowadays Italian listed and non listed companies adopt two distinct set of accounting principles. Starting from 2005 the mandatory adoption of IFRS for all listed companies stimulated a huge process of change which involves not only the technicalities about recognition, measurement and disclosure of accounting events, but also entails a cultural revolution in our accounting tradition developed through more than 100 years.

In this paper are shown the findings of a research project whose purpose was to identify the most relevant impacts produced by IFRS adoption on company information systems and performance analysis and management.

The basic research hypothesis is that the differences between domestic accounting principles and IFRS determine changes in company information systems. This changes involve the whole information production process: collection of data, manipulation and communication of information. Just as example we could think at impairment test: its application require the acquisition of conjectured information, from internal information sources i. e. the management information system, or from external sources.

Moreover, as a second research hypothesis, IFRS adoption improve the company disclosure with a wider set of management information (i. e. about business combination, segmental reporting, or transactions with related parties) this should create a convergence tendency between external reporting with those required by internal users.

The research was developed through a first step of deep analysis of both the theoretical contributions and the set of IFRS, in order to identify the range of possible implication induced on Italian listed companies, in their management control systems, information systems, and performance indicators.

Afterwards the hypothesis about the implications of IFRS adoption have been tested employing the case studies technique.

In brief the results show that only a limited number of IFRS generate significant implications on management control systems, because increase the diffusion of dimensions and indicators formerly not widely employed (at least on Italian context).

Instead by the side of information systems is possible to determine more relevant implications caused by the introduction of new applications useful to produce the new set of mandatory information.

Finally, a limited set of research hypothesis, not even confirmed by the empirical test, drew possibilities for IFRS adoption to stimulate changes on management information processes: for example the adoption of fair value accounting for property, plants and equipments, should produce consequences on product costing methodologies. The results don't confirm this hypothesis, showing the existence of a kind of double track in elaboration processes which keep separate external from internal reporting: the former IFRS compliant, the second still connected with the traditional accounting principles.

This paper gives a deeper description of the implications related to the adoption of IAS 1 for what concern the construction and analysis of the income statement.

Income Statement: theoretical features and IFRS adoption implications

About the income statement, the IAS 1 fixes a minimum content and leaves each company free to give both in the report or in the descriptive section, additional detailed information about the most significant income and expenses. Moreover the IAS 1 requires to report an analysis of the expenses, employing as alternatives, cost classification by nature or by function. Finally the IAS 1 does not consent to report separately income and expenses arising from extraordinary events.

According to management theoretical principles the Income Statement should be useful to briefly represent the development of the economic result¹. For this purpose all income and expenses should be grouped in significant areas referred to the distinct management functions²: the analysis of earnings generated in each area will then give evidence of the income produced and the related costs for consumption of needed resources³.

Keeping in mind these theoretical assumptions about the income statement, we can then summarize the implications arising from IAS 1 adoption in the following features:

– informative systems;

¹ The periodical earnings estimation for a company with a going concern horizon is settled up through an algebraic sum of incomes and expenses referable to management operations realized during a certain period...thus earnings become a measurement of the economic result of these operations. Ferrero G., Dezzani F. Contabilità e bilancio d'esercizio, Giuffrè. Milano, 1983. P. 9.

² The income statement, as synthetic representation of the company performance, is more effective if we classify all the management activities into functional categories and we refer income and expenses to those categories. Sostero U., Ferrarese P. Analisi di bilancio, Giuffrè. Milano, 2000. P. 25.

³ If we create an economic equation representing the operating earnings, the sum of expenses gives a monetary expression of the resources employed, while the sum of incomes are related to the quantity of goods or services produced. Marchi L. (a cura di), Introduzione all'economia aziendale, Giappichelli. Torino, 2003. P. 387.

- income statement functional areas;
- cost classification criteria;
- lack of comparability.

Informative systems

In general terms, the las 1 adoption doesn't produce significant implications on informative systems. The results of the interviews carried out with the managers of the financial reporting department show that the procedures of alignment of the company previous income statement to the contents defined by the las 1 did not require substantial adjustments in the chart of accounts. The only reliable modifications concern the exclusion of those accounts related to extraordinary events and introduction of new accounts useful to outline the economic result arising from non recurring transactions.

A further modification, even if not necessarily relevant, involved the procedures of classification of every single account into the content compliant with las 1.

Income statement functional areas

As described above, the informative capacity of an income statement is improved through an effective classification on income and expenses with the purpose to isolate those items arising from the core business activities.

All efficiency analysis on earnings should concentrate on this values trying to comprehend the key factors able to improve the EBIT generation, which in turn, should represent the major source of the overall company profitability.

Table shows a comparison between the income statement function areas suggested by management theory, and those employed by Italian accounting principles and las 1 (table).

Income statement and functional areas

Management Theory	Italian Accounting Principles	las 1
Operating Extra-operating Financial Extraordinary Tax	Operating Financial Extraordinary Tax	Operating Financial Tax

Management principles suggest to employ five function areas in order to better separate income and expenses to obtain a clearer segregation of operating income and expenses and allow a more reliable measurement of earnings generated by the goods produced or sold in the period as residual of the correlated consumption of resources. The operating earnings are then disclosed in correlation to

a driver of operating activity – the flow of goods or services produced or sold – to which should be therefore referred all the detailed income and expenses.

The income statement structure adopted by the las 1 does not consider the extra-operating area. The items attributable to that area, if any, are then collected into the operating or the financial area, altering the determination and analysis of the related earnings. We have to take into consideration that also Italian accounting principles do not employ this section, maybe considering that the distinction of management activities as operative and extra-operative can result quite subjective among different companies. However must be noted that the structure of income statement compliant with Italian domestic principles requires to classify in separate items income and expenses arising from revaluation and depreciation of asset and financial instruments. If we consider that the adoption of fair value is increasing the weight of these components, their classification inside the financial area can bring to misleading information, also in the light of the purpose of financial statement as defined in the art. 15 of the Framework: *«The economic decisions that are taken by users of financial statements require an evaluation of the ability of an entity to generate cash and cash equivalents and of the timing and certainty of their generation»*.

Similarly the option to not consider in the income statement an extraordinary section affect the results in the operative area. All the interviewed reported that accounting transactions once considered as extraordinary according to our national standards, have been placed into the operative area as integration of «ordinary» income and expenses. This treatment could generate a distortion in the correlation between incomes for production or sales and cost of consumption of operative resources: in fact the inclusion of extraordinary values in a cost line will show an overestimated consumption, drawing unreal inefficiencies.

Cost classification criteria

An additional implication arises from the opportunity allowed by las 1 to every company to customize the income statement either by selecting different criteria for the classification of expenses in the operative section and by defining the proper number of relevant items to disclose.

For what concern the motivations that drove the selection of the cost classification criteria, some managers interviewed reported that they retained more convenient to adopt the classification by nature because it entailed just unimportant changes in information systems, and it ensured a higher level of reliability in the first transition step, when it was also important to ease the auditors' activities.

The same managers also affirmed to judge as more effective to classify expenses by function, but just few of them expressed the intention to change in the future the content of its income statement. This feature allow us to trace two distinct lines of behavior:

- a *defensive* line, taken by companies which basically operate against domestic competitors, not involved in IFRS adoption. This companies judge favorable to continue with classification by nature, with the general purpose to manage the alternatives allowed by IFRS in order to align as close as possible the kind and quantity of information produced to those disclosed by their competitors (compliant with national accounting standards), and avoid possible risks of emulation strategies triggered by the surplus of information;
- a *proactive* line, taken on the contrary by companies operating in multinational contests whit players used to employ economic reports with cost classification by function. In this case the managers interviewed expressed their willingness to change their income statement structure in the next 3–5 years once they got experienced about the major accounting innovations tied with IFRS adoption. For this companies the change of the structure in their report is retained in some sense as compulsory to be considered as a «global player» in their specific arena.

We could then give a general view to these concepts declaring that companies tend to adopt IFRS aligning their disclosure with the predominant features of their specific local or global operating context.

Lack of comparability

In general terms the alternatives allowed about expenses classification bring difficulties on comparability of income statement between different companies, where different classification criteria have been adopted. But the lack of comparability increase where different companies retain relevant to disclose a different number of incomes and expenses line items.

A statement user in this case will probably run into troubles if he tries to create homogeneous reports: in particular he will be constrained to reduce every income statement to the content of the most condensed one. Even if we don't take into consideration the necessary subjective – and probably different – decisions about the consolidation of costs in the more detailed statements, the result obtained could not be significant where the reference statement is too concise to give useful information about the impact of the main resources on company operating profitability, or about the composition of the main function areas.

Moreover, in our opinion the most significant impact produced by las 1 adoption happens when the income statement do not disclose in a separate line item the change of finish goods inventory.

The lack of this information produces two essential limitations on the effectiveness of the statement:

- it's not possible to ensure a correct comparison between statement of different companies;
- it's not possible to recognize the activity driver to which are correlated the expenses disclosed.

As exemplification we report in the following figure an abstract of the income statement of year 2006 presented by Geox (a listed company operating in the footwear and apparel markets):

(Thousands of euro)	Notes	2006	%	2005	%
Net sales	3	612,258	100	454,963	100
Cost of sales	4	(302,018)	(49,3)	(214,499)	(47,1)
Gross profit		310,240	50,7	240,464	52,9
Selling and distribution costs	5	(30,882)	(5,0)	(23,998)	(5,3)
General and administrative expenses	6	(94,195)	(15,4)	(74,506)	(16,4)
Advertising and promotion	7	(50,257)	(8,2)	(39,022)	(8,6)
EBIT	3	134,906	22	102,938	22,6

Figure 1. Geox income statement 2006

As can be noted the statement employs the classification of expenses by function. Moreover in the descriptive notes are disclosed detailed information about the composition of the cost of sales (Figure 2).

Cost of sales	2006	2005	Change
Consumption of raw material and finished goods	242.259	Production? or Sales?	73.627
Processing	31.697		12.050
Wages of direct production personnel	7.082		697
Other direct direction costs	2.041		402
Direct cost of goods sold	283.079	196.303	86.776
Other wages and salaries	8.426	???	437
Other indirect costs	4.645		590
Indirect costs	13.071		1.027
Industrial depreciation	5.868		(284)
Total	302.018	214.499	87.519

Figure 2. Geox cost of sales composition

The detail about the cost of sales does not put in evidence the change in inventory for finished goods, neither are reported descriptive notes about its treatment. We could argue that the balance sheet compilers decide to classify this item along with the consumption of raw materials and finished goods (adopting a prevalence approach), or they decide to

separate the entire value into its single components and classify them by nature in order to disclose every single line item correlated to the mass of goods sold, or we could imagine further different solutions, without any certainty about the real solution adopted.

Consequently with this lack of information it's not possible to correlate the cost line items to a proper activity driver (the volume of goods produced or sold), therefore the comprehension of the profitability causes become uncertain and furthermore the only item comparable is limited to the total cost of sales, too concise to give useful information.

The absence of information about the change of finish goods inventory also occurs when companies decided to adopt the cost classification by nature, as in the case of API income statement (Italian company operating in the petrochemical sector).

The discussed problems of comparability could be definitely solved, or reduced significantly, with the adoption of the XBRL taxonomy. The further section of the paper present a brief description of the many improvement expected to be produced by the employment of this new disclosure process.

The final consideration we would like to draw is about the supposed alignment between external and internal reporting induced by IFRS adoption. The empirical survey do not allow to confirm this hypothesis: all the interviewers reported that internal company economic reports have not been changed at all after IFRS adoption as well as the decisions about external income statement structure and content did not take into consideration the internal reports, actually two distinct track of disclosure (one for internal users and one for externals) seems to live together keeping the same distance of pre-IFRS adoption.

The capacity of XBRL: the comparability between companies that adopt international accounting standards becomes possible

The eXtensible Business Reporting Language is one of the most important IT news introduced in economic-business matter in the last few years. The adoption of this language has triggered a mechanism that is revolutionizing not just the system of reporting, but all the financial disclosure¹.

¹ This progress in financial disclosure is attributed to Charles Hoffman (Member of the American Institute of Certified Public Accountants, AICPA). The problem put by Hoffman, despite the enormous progress of information technology, is that IT media available can't really allow the information exchange between stakeholders. He shows how data can be shared with other people, but not with other computer systems. The concept is perfectly explained in the following sentence: «The financial world had become trapped in an electronic Tower of Babel, endlessly copying and pasting information from one system into another» (Kernan K. The Story of Our new language – Personalities, cultures, and politics combine to create a common, global language for business – based on a chronicle of Charles Hoffman and Louis math, paper AICPA. N. Y., 2009).

Information systems have always been considered a strong potential for the «company system¹» so that they can be considered an its «subsystem»².

Given the need to communicate information outside, it is important to provide flexible process, so that it is possible to process the data according to specific requirements. Indeed, an information system is aimed not only to meet the needs within the «company system» but also, and often is the most relevant part, to the outside: to all potential stakeholders. Companies' information systems allow for more reliable information, thanks to that, many items having been initially inserted, become directly processed by several actors, avoiding many risks including the possible duplication³. According to this, the language XBRL (eXtensible Business Reporting Language) facilitates information' fairness and transparency.

The purpose of this new language is to increase the efficiency and precision of communication especially with certain stakeholders: shareholders, markets and public administration. Thanks to this language the financial statement from «analog» becomes «digital»⁴. It yields a set of information that are reworked directly, even if the systems of accountancy adopted are different.

In order to achieve greater accounting harmonization among countries, the European Union has imposed on large companies, banks, insurance companies and other financial intermediaries to prepare financial statements according to International Accounting Standards (IAS / IFRS)⁵. As described above the «minimum content» required by IAS 1⁶ has contributed to international accounting harmonization: while it is fixing fundamental items, still leaves discretion to editors in developing the financial statements according to their needs.

Indeed, the IASB, while presenting in accounting standards which statements are necessary⁷, do not proposes fixed patterns⁸, allowing

¹ Bertini U. Il sistema d'azienda. Schema di analisi. Giappichelli, 1990.

² Marchi L. I Sistemi Informativi Aziendali, third edition, series studies business management; «E. Giannessi» Giuffrè editore, Milano, 2003, P. 3.

³ For further information see N. Castellano, «Controllo di gestione ed informazioni: un approccio integrato», series studies business management «E. Giannessi», Giuffrè editore, Milano, 2005, capitolo 2.

⁴ Fradeani A. La Globalizzazione della Comunicazione Economico-Finanziaria: IAS/IFRS e XBRL, series studies business management «E. Giannessi», Giuffrè editore. Milano, 2005. P. XX.

⁵ International Accounting Standards /International Financial Reporting Standards.

⁶ Minimum items on the face of the statement of financial position, IAS 1, paragraph 54 and minimum items on the face of the statement of comprehensive income IAS 1, paragraph 82.

⁷ International Accounting Standard № 1, paragraph 10.

⁸ As it is required by Italian Civil Code.

editors to shape each statement according to their specific needs. Surely this factor can only act positively for the adoption of these standards, but at the same time implies the creation of different reports, from company to company, with evident problems in terms of comparability¹. The combination of XBRL and International Accounting Standards is allowing the creation of a common code of communication, especially for financial statements. The result of the partnership between international accounting standards and XBRL is the IFRS Taxonomy developed by the IASC Foundation XBRL Team. The IFRS Taxonomy provides a set of balance sheet items common to all companies and countries, not only with regard to recording, but also for the following evaluation and finally, for the presentation.

Taxonomy offers a precise number of items that can't be integrated with other. The opportunity to insert additional items, sub-classification, partial results to highlight some aspects, is reduced because such items are only those provided in the IFRS Taxonomy². From this it follows that each element is inserted into a standard pattern. The editor has to choose the policy that allows to give a better representation of the financial and economic position³, but for each policy adopted the editor's discretion is linked by a particular statement⁴. The international standardization of financial statements has many advantages especially in terms of comparability.

Through the drafting of financial statements with the same standards and now with the same computer language is possible to achieve results that just a few years ago were unimaginable. The comparison of information among companies residing in geographically distant

¹ Indeed, each entity highlights items and delivers reports suited to the specific environment without having to conform to any pattern, because principles set the minimum content to be submitted. The main effect of the adoption of a structure so flexible is the proliferation of different schemes and so more difficult to compare.

² However exists a different Taxonomy depending on whether a separate budget rather than a consolidated. At present it has been processing the IFRS Taxonomy 2010.

³ An entity must normally present a classified statement of financial position, separating current and noncurrent assets and liabilities. Only if a presentation based on liquidity provides information that is reliable and more relevant may the current/noncurrent split be omitted, IAS 1, paragraph 60. The income statement can be presented by function of expense or by nature of expense IAS 1, paragraphs 99–105.

⁴ For example the IFRS Taxonomy 2010 provides: a) statement of financial position, current/non-current. (Consolidated and separate) financial statements; b) statement of financial position, order of liquidity – (Consolidated and separate) financial statements; c) income statement, by function of expense – (Consolidated and separate) financial statements; d) Income statement, by nature of expense – (Consolidated and separate) financial statements; e) Statement of comprehensive income – (Consolidated and separate) financial statements; f) Statement of comprehensive income [alternative] – (Consolidated and separate) financial statements.

countries marks a great result but not an end point, it should be only a starting point. The taxonomy adopted by each person who is involved in preparing an annual report is standard, so it can't be customized: this factor allows to overcome the limitations arising from the preparation of many different tables hampering comparability. Users of financial statements may revise the information, reclassify the prospects according to their needs without the risk of distorting the content.

Concluding remarks

In brief the results of the empirical survey show that IFRS adoption probably reduced the emphasis on interpretation of company economic dynamics. This assertion finds strong agreements in several scientific contributions, not also in Italy¹ where probably, with difference with other countries, there is a deep-rooted tradition and a strong familiarity with the analysis of the economic feature of a company performance. In particular comparability seems to suffer strong limitations by IFRS adoption.

The autonomy to choose the number of line items to disclose, as well as the cost classification criteria is undoubtedly allowed with the purpose to improve reliability, but on the other hand strong limitations on comparability are generated.

Probably the difficulties, encountered so far, in the analysis and comparison of financial statements of different companies are intended to fade away; XBRL language could be the solution, the medicine to the operational problems we found. Comparing and analyzing reports, thanks to this new language, will be easier, faster and more reliable.

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¹ *Barth M. E.* Global Financial Reporting: Implications for U.S. Academics // The Accounting Review. 2008. Vol. 83. № 5. P. 1159–1179. The author set out several research questions about IFRS, some of them relates to income statement relevance: «What are the implications of incorporating more expectations about the future in financial statements today? In particular, what does profit or loss mean when most, or all, recognized assets and liabilities are measured at fair value? Is this measure of profit or loss one that can help investors, in conjunction with other financial statement information, to make their investment decisions? do global standards fail to reflect firms' underlying economics in some situations? If so, why?».

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МОДЕЛЬ МАТРИЧНОГО УЧЕТА КАК ОСНОВА ДЛЯ ИНТЕГРАЦИИ НАЦИОНАЛЬНЫХ СИСТЕМ УЧЕТА В ЕДИНУЮ МЕЖДУНАРОДНУЮ СИСТЕМУ УЧЕТА И ОТЧЕТНОСТИ

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Бухгалтерский учет как информационно-технологическая система имеет искусственное происхождение, т. е. представляет собой *артефакт*, поскольку она была создана людьми, и первым, кто изложил ее в письменном виде, был францисканский монах, профессор математики, итальянец Лука Пачоли (1445–1517) в трактате «О счетах и записях» (1494). С тех пор в способе изложения технологии бухгалтерского учета не произошло каких-либо принципиальных изменений.

Описание технологии бухгалтерского учета осуществляется теми же методами, какими он осуществляется на практике. Таблицы объясняются с помощью таблиц, инструкции с помощью инструкций, расчеты с помощью числовых примеров расчетов и этот ряд можно продолжить.

В результате бухгалтерский учет ассоциируется, прежде всего, с неким искусством превращать информацию о фактах хо-

зяйственной жизни в финансовые отчеты, но в меньшей степени с наукой. Согласно воззрениям И. Канта, которые разделяли и классики российского бухгалтерского учета, «в каждой науке столько истины, сколько в ней математики».

Бухгалтерский учет как объект математического моделирования

Можно со всей определенностью утверждать, что сегодня в системе традиционных средств и методов бухгалтерского учета практически отсутствует ее необходимая составная часть – математические основания бухгалтерского учета. Достаточно, например, открыть любой учебник как по теории учета, так и по экономико-математическим методам, чтобы убедиться, что в них попросту отсутствуют разделы, посвященные математическим основаниям бухгалтерского учета.

Язык математики, как показывает вся история развития науки, обладает необходимым единообразием в понимании и большей общностью в логических рассуждениях и выводах, чем просто профессиональный язык, близкий к естественному. Поэтому математическая модель бухгалтерского учета, независимая от конкретных форм существования бухгалтерского учета, но способная принимать форму любой из них, имеет перспективу быть понятой и принятой специалистами в любой стране мира. Именно благодаря единообразному и компактному математическому образу бухгалтерского учета будут понятны общность и различия между национальными системами учета, которые и являются камнем преткновения при переходе на международные стандарты.

Надо сказать, что в России попытки найти математические основания бухгалтерского учета предпринимались еще в XIX–XX вв. [1, 2, 9, 11, 12, 14]. Эта проблема исследовалась современными русскими авторами [3–8, 10, 13], а также зарубежными [15–25].

Изучение перечисленных работ показывает, что авторы предпринимают попытки использовать различные математические подходы к моделированию учета, но большинство современных нам работ посвящено приложениям матричной алгебры, что позволило выделить это направление исследований под названием *матричный учет*.

К сожалению, данное направление исследований не получило до сих пор должного признания, на что указывает отсутствие соответствующих разделов в программах подготовки бухгалтеров как в России, так и за рубежом. Преподавание до сих пор ведется с помощью методических приемов XIX в., основанных на исполь-