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The central budget management system and the impact thereof

One of the key elements of the state budget reform is that of the execution of the budget, making the utilization of public funds and EU subsidies more transparent and controllable. The purpose of the concept of the budget management system developed by the Ministry of Finance is to introduce, besides the reorganization of the Treasury processes, changes in the regulatory system for the central budgetary institutions such as ministries, government offices, central offices, law enforcement agencies and other background institutions based on the reporting of preliminary and comprehensive commitments, in order to support the reform process in this way as well.

According to the plans, the idea is to leave the fundamental professional competences with the central budgetary institutions but at the same time, to create the opportunity for the enforcement of financial-budgetary controlling by applying a strict controlling system, from the planning of the budget through financial performance to final accounts.

As a relevant element of the state budget reform, along with the partial modification of the regulatory environment, it makes sense to develop a centralized and integrated system which uses state-of-the-art IT solutions. This complex system allows that the management of the economic events of the budgetary institutions is followed through their entire lifecycles

in such a way that the system is capable of continuously supplying aggregated data on the utilization of the available funds.

The migration of the state-state, citizen-state and state-enterprises relationships into the electronic space would, in turn, facilitate the formation of an efficient state as a service provider.

BRIEF SUMMARY OF THE CURRENT SITUATION

The Treasury organization of the state

The implementation of the Treasury tasks plays a critical role in the macro-level management of the public finance system. The period that has elapsed since the development of the Hungarian Treasury model in 1996 has proven that the existence and role of the Hungarian State Treasury is indispensable in the disbursement and collection of public funds in the context defined by the laws.

The IT systems of the Hungarian State Treasury that used to support the original Treasury tasks, which function even now, mostly function according to the needs defined 10 years ago. These systems are obsolete both on the level of process management and on that of

technological and technical solutions, they cannot efficiently fulfill the specialized professional requirements of the present.

As a result of *non-integrated and decentralized operations*, the consistency of information can only be ensured with difficulty, which results in the low standards of information supply.

As a result of the lack of the comprehensiveness of undertaking commitments and that of performance-based financing, *there is possibility for overspending*, and the utilization of unplanned income items without control, which cannot be planned on the level of the state budget. The current system is not suitable for the reception of electronic suppliers' and service providers' invoices, furthermore, it is not capable of handling e-money either.

The *systems* which are fundamentally *based on the flow and processing of paper-based transaction documents*, besides their low cost-efficiency, do not support the enforcement of the administration cut program announced in the framework of the state budget reform, on the one hand, and they make it almost impossible to ensure up-to-date, truthful information, on the other hand. This means, in practice, that the handling of economic events requires the maintenance of a higher than necessary volume of human resources at the Treasury.

Budgetary institutions

The accounting (financial management) systems that can be freely chosen by the budgetary institutions, which are non-centralized and which operate in a non-uniform structure are on very different levels of development on the one hand, and they do not allow the representation of up-to-date figures of the central budget on the level of the general ledger, on the other hand. The information aggregated from the institutional levels and those on the level of the national economy usually do not agree, as a

result of the differences in the institutional and Treasury records, the periodical reconciliations of which generate significant and superfluous extra efforts. In the past few years, a large proportion of the ministries and central budgetary institutions have implemented integrated financial-accounting systems (various ERP¹ systems) from their own resources, as the introduction of *the Centralized Payroll System* (Hungarian abbreviation: KIR), which demanded considerable sacrifice, was not followed by the implementation of a system performing centralized accounting tasks.

The various types (financial, general ledger, tangible assets module) of integrated financial management systems replaced and implemented at a number of organizations mostly rely on IT support whose standards are in line with the requirements of our age, however, no interoperable relationship with the more backward central Treasury systems is possible. The institutions continue to conduct significant paper-based dataflow, and the underlying registration system also has to be maintained redundantly.

In order for the financial management tasks to be integrated on the highest possible level at the budgetary institutions, as well as to make them operate with the lowest possible staff costs, with a significantly lower level of paperwork, a complex central IT system, which is capable of handling both the Treasury and the institutional management tasks in the same system, needs to be developed.

THE NECESSITY OF THE INTRODUCTION OF A NEW SYSTEM SUPPORTING THE PROCESSES OF THE EXECUTION OF THE BUDGET

It is the reform of the execution of the central budget, the rendering of the management of public finances transparent and entirely controllable, the simplification and digitalization

thereof that justify the development and implementation of a new system that supports the execution of the budget. The design of a new, centralized, real time system called *the Budget Management System* (Hungarian abbreviation: *KGR*) was developed as part of the state budget reform².

In order to be able to develop a complex, up-to-date Treasury system,

- which monitors the execution of the budget, the spending of public funds in a controllable way, by using a project approach,
- which provides up-to-date and integrated information to each relevant player on the appropriate level,
- which is efficient and easy to operate,

the views on the operation of such a system should be changed, both with regard to the "Treasury approach" and the regulatory systems, and with regard to the applied IT solutions.

The most important task of KGR is to "remove" Treasury from the economic space, in order to ensure that the goals set in the convergence program, the New Hungary Development Plan, as well as in the chapter-level IT strategy of the Ministry of Finance should be achievable by incorporating the tasks related to cashflow and financial management into this organization.

The KGR system means a change with regard to both its functionality and maturity in the overall network of institutions of the central budget. According to the objectives, the system will be applied for both the appropriations of the institutional budget and those managed by the chapters. However, the planned regulation does not aim to withdraw professional and financial management competences from the institutional system. KGR first of all focuses on getting the current principles of financial management observed and on controlling the observation, by also modernizing operation and sometimes concentrating the lat-

ter and applying electronic payment methods. The transformation of regulation and the modernization of the operational mechanism of financial management should, through the KGR system, contribute to the higher level performance of the professional tasks dealt with at the institution.

Unless an application system placed on entirely new foundations and implemented with up-to-date technology and knowledge, as well as a system that serves the former with state-of-the-art technologies, are implemented as soon as possible, *the operating risk will increase further*, which may involve unforeseeable consequences. As it also turns out from the above, there are no real alternative solutions to remedy the current situation. The current system cannot be developed further. The up-to-date solution will definitely be the operation of integrated, on-line, real time and common databases, where each data will only be entered into the system once, at the place where it was generated.

THE ELEMENTS AND BREAKDOWN OF THE BUDGET MANAGEMENT SYSTEM

The complexity of the system outlined so far comprises the financial government, the central budgetary institutions and the Hungarian State Treasury, which is the state bank that performs the financial tasks. The modules that serve the functionality of KGR can be broken down into four interrelated groups:

- IT reorganization of specialized Treasury systems,
- the implementation of a uniform, integrated institutional financial-accounting system,
- the implementation of a uniform budget planning system,
- the development of a public finance management information system.

Reorganization of the Treasury systems

The replacement of the current Treasury IT system at the same time creates an opportunity for the reorganization of tasks and processes and for putting more-up-to-date IT support in place. Besides the implementation of a classical bank account management system called the BSZM module, the comprehensive implementation of the appropriation management (EGM) module and the commitment (KTM) module will be important elements of the KGR as its main functions, by which the electronic data connection between the budgetary institutions and the Treasury can be established.

The tasks of EGM include the registration of budgetary appropriations and the modifications thereof according to the decrees or laws in which these changes were ordered, as well as, based on these, the execution of the opening of the subsidy limits of the appropriations managed by the institutions and the chapters. The services provided by the module are as follows:

- acceptance and registration of the original appropriations defined in the Budget Act for the year in question on the basis of the data supplied by the Ministry of Finance and the Treasury budgets submitted by the chapters;
- reception of the modifications of the appropriations according to the levels of competence, from the appropriation owners and those who have the authority to perform modifications;
- operation of the decision registration system containing the modifications in the competence of the National Assembly, the government and the Ministry of Finance;
- execution of the subsidy limit openings;
- connecting the current appropriations with the KTM system and its subsystems;

- performing general ledger postings and ensuring detailed analytical records for the institutional financial management systems;
- performing special handling tasks (such as blocking, the retention of the net financing subsidy limit);
- providing information to the appropriation owners and the management information systems.

The relevant novelty in this area is that the modifications of the appropriations can only be accepted and confirmed on-line and/or in another electronic form in the future.

KTM is responsible for managing the commitments undertaken and performed by the central budgetary institutions, the budgetary chapters, the appropriations of the national economy, the social security funds and the separated state funds. The services provided by the module are as follows:

- reporting of the intention to undertake commitments for the appropriations (for the scope defined in the law) under the EGM system, controlling and approving the acceptability of the commitment, issuance or rejection of a commitment number;
- registration of the expense and income commitment of the current year;
- registration of long-term expense commitments;
- at the time of launching the transfers, the preliminary control of the commitment and/or the availability of the appropriation coverage, as well as public debt monitoring in the case of payments from certain appropriations;
- registration of information related to the realization of income and expenses.

BSZM is responsible for keeping the accounts of the Treasury and the current account holders as defined in law, the accounts to be used for the financial execution of the tasks defined by

the government and the settlement accounts of the national economy. It is also BSZM's responsibility to ensure the cash supply in an integrated, multicurrency (also supporting the introduction of the euro) banking system, which is independent from branches. The services provided by the module are as follows:

- reception of subsidy limit openings from the EGM system;
- reception of budget-related transactions from the KTM system, feedback on the performance/rejection of transactions approved by the KTM system in the account keeping system;
- handling of transactions directly received by the BSZM system (income, prompt collections, costs related to account keeping);
- liquidity coverage examination and debiting, as well as separation of coverage (blocking), for example when launching foreign currency transfer orders;
- ensuring the cashier's desk function (cashier's desk, vault, preliminary reporting);
- supplying on-line information (transactions launched and received) to liquidity management for the calculation of the momentary portfolio of the KESZ (Standard Treasury Account);
- preparation of aggregated and detailed reports on the accepted but not yet performed transactions;
- ensuring posting to the institutional financial management systems on the basis of the defined general ledger correlations;
- preparation of account statements (differently by client types) electronically, or if necessary, on paper;
- public debt monitoring of the eligible entities on the basis of predefined viewpoints, rejection of the order if necessary;
- satisfaction of statutory requirements aimed at the prevention of money laundering, turnover monitoring, data supply.

The introduction of the Treasury modules of KGR makes it possible to replace the slow solutions based on paper-based transaction documents, using manual data entries and requiring a high volume of resources in the area of the modifications affecting the annual appropriations to be executed in one's own competence, as well as in relation to the reporting of commitments to the Treasury.

Besides the three main modules (BSZM, EGM and KTM) of the Treasury systems, which are visible and tangible to all the players, some other supporting subsystems are also necessary.

In the reform steps of executing the budget, an important role should be fulfilled by the management of cost liquidity, which is supported by the liquidity management module (LMM module) of the KGR concept. The financial transactions of the current day are reviewed by liquidity management and the latter may dispose of the current day or deferred launching of these transactions by taking the available funds into account even item by item.

With regard to the central budget, the process of financial performances is recorded and its critical majority is realized electronically (in the form of bank transfers), this is why the implementation of electronic account acceptance (EBPM module) may mean a genuine change of paradigm in this area. The point of the EBPM system is that the accounts, by excluding paper-based transaction documents, are passed from one ERP system to the other electronically, by applying a central EBPM module.

With regard to the fact that the return and current account systems of APEH (the Hungarian Tax and Financial Control Administration) and VPOP (the Hungarian Customs and Finance Guard) are not connected to the Treasury registration systems, i.e. the

comparison of the turnover of the national economy accounts managed by the Treasury and the data of the return processing systems managed by the tax authorities requires significant efforts, a module responsible for controlling the returns and performances (BTM module) should also be built up within the KGR.

Introduction of a uniform institutional financial management system

According to the current regulation, the organizations of the Treasury may decide, in their own competence, on the selection of the accounting system that they wish to apply, which are sold in the market, and which are, in many cases, developed by relying tools that are considered obsolete these days. As a result, the software applied for this purpose by the individual institutions is very diverse, thus the records kept by these organizations are not uniform either.

In the course of the implementation of the institutional accounting module of KGR (IKM module), integration between the Treasury and the institutional tasks can be developed. The application of a single, uniform financial management and administration system that refers to the central budget as a whole, allows that the tasks, as well as the related obligations and responsibilities of the individual institutions related to financial management do not change.

IKM is responsible for meeting the reporting obligation of the organizations of the public finance system, as well as its obligations of bookkeeping meant to support the financial statements, especially by enforcing the principles of unity, continuity and transparency, by taking the rules of budgetary financial management into the account to the maximum extent. Furthermore, it is also responsible for booking the data related to the KESZ Treasury entities,

the national economy accounts and the current account holders. The following services are provided by the module:

- performing the tasks of preparing the financial statements and the balance sheet;
- ensuring data consolidation in the individual subsystems of the public finance system and between the individual subsystems of the public finance system;
- application of a comprehensive chart of accounts extending to each subsystem, including the national economy accounts;
- it should satisfy the data supply requirements and the management information needs.

In order to be able to prepare uniform, and in consequence, reliably aggregable statements on the level of the state budget, such a general ledger structure should be applied which is obligatory for each budgetary organization to a predefined level. Of course, if it is justified by the financial management of the individual organizations, further breakdowns to be applied individually should be allowed, without changing the uniform structure.

The implementation of a certain economic governance system called the ERP system³ in the nearly 700 central budgetary institutions requires, beyond development, enormous organizational, management and logistical efforts, thus the roll-out process meant to ensure comprehensive use may take even as long as 4–5 years. This means that the KGR concept cannot be implemented in a short time, even without the implementation of the local government subsystem.

As consequence of the points mentioned above, the implementation of the other KGR modules can be performed sooner than that of the IKM module, this is why a service that can be used on a uniform platform, i.e. an interface connection, should be made available to the appropriation owners until its implementation is completed, in order for them to be able to

perform their tasks related to commitments, appropriation management and cashflow in a real time, online form.

System supporting budget planning

One of the main tasks of budget management is to take care of the process of budget planning, which is generally performed by each chapter, mid-level management and the subordinated budgetary organization with scarce IT support of very diverse quality year by year. However, no state budget-level planning system extending to the entire budgetary sector has yet been implemented. By introducing KGR, there seems to be a historical chance for the implementation of a centrally operating *Budget Planning System* (KTR module) aimed at managing the process of planning the budget, with integrated processes and with a uniform and appropriate authorization system, besides the transactional systems related to financial management. The target scope may be the support of the breakdown (redistribution) of the Treasury and elementary budgets, besides the preparation of the proposed budget plan. In current practice, from among the well-known planning logics, it is the top-down version that is used most widely, however, an increasingly larger space should be given to the added bottom-up logics as well, which mixed solution is called the contraflow planning system in technical literature. Planning is a multi-dimensional process in all respects and we have to take it into account that KTR has to be capable of supporting the task-based planning logics, whose use will very probably become widespread in the future, which, in practical terms, means a new dimension of the planning and reporting process.

As a result of the introduction of the system, the planning process will become faster, the data will be transferred automatically, the man-

ual workload can be reduced, data consistency and data quality will improve. In such a way, the required analyses can be performed faster, the time spent on the process technology will decrease, which may result in the strengthening of a genuine foundational planning approach.

Management Information System

The implementation of the KGR project by the government does not only project the possibility of creating a smaller and more efficiently operating state but it also supports the simple and fast solution of accessing management information. It is also an old dilemma to release the information asymmetry between the supporting and the supported organizations, which is due to the fact that information is generated on the side of those who need support, and the decision-makers can mostly rely on the information generated on the applicants' side in order to ensure the appropriate allocation of the funds. It is a goal to develop such a unified, on-line, state budget-level management information system built on the foundation of KGR, where the quality of data and the speed of information delivery are considerably more favorable than in the current circumstances and where this system provides data required for decision-making to the various supervisory and management levels on the basis of its own refined authorization system. Within the KGR system, the *Information Supply and Evaluation System* (ISZM module) was defined as a separate module but it supports management in the making of decisions by applying the data warehouse technology from the overall system.

The *ISZM module* is aimed at consolidating, analyzing, extracting, storing in optimized time series, as well as the provision of information stored in the separate modules of the system and those coming from external information

systems, both towards the internal and external users in the form of OLAP⁴ and standard reports. By generating real time information, it becomes possible to realize budget-level data supply (daily reports, etc.) as early as on the current day, even by ensuring an opportunity to the responsible professional managers of the financial sector to query for, or download the required statements immediately.

KGR overview diagrams

On the one hand, *charts 1 and 2* show what modules the individual user groups of the KGR are linked to, on the other hand, the main processes of the operation of the system, as well as the major links between the modules are well visible in them.

THE IMPACT OF KGR ON THE BUDGETARY ORGANIZATIONS

According to the points made so far, the implementation of the system at the same time means the implementation of the reform of the Hungarian State Treasury, the positive impact on the financial government is also visible, which will practically be tangible in supporting management in making decisions through the almost unlimited accessibility of the information but its impact on the budgetary organizations is much more complex than this.

Lack of integration at the economic areas of the institutions

Institutional financial management, which is by far not ideal, struggles with the lack of integration opportunities and they solve the extra tasks arising from the latter by involving unnecessary resources. The harmony, which

seems to be natural between the individual areas, has not developed in several other areas, due to traditional or other reasons. *Table 1* shows the correlations between the integration opportunities and the KGR system.

For releasing the negative effects arising from the lack of integration, the budgetary organizations have given various responses by relying on their own resources to date but one can only provide a uniform solution for the main areas in a centrally managed form. The KGR concept wishes to create opportunities for filling the gap without the integration of the tasks performed by the Payroll System (KIR), for the time being, without comprehensively reckoning with the processes of the internal specialized systems.

Positive and negative impacts

The KGR project represents a significant barrier and retentive power against free financial management in protecting the integrity of the independence of institutional financial management. On the one hand, it creates the opportunity for the introduction of commitment rules tied to comprehensive preliminary reporting, which now reduces the freedom of the institutions to procure, invest and manage human resources. On the other hand, it supplies continuous information on institutional financial management (the contracting practices, the potential wasting of money) already at the moment of occurrence but later, it also gives continuous information to the supervisory authorities with access rights from the analyses prepared from the time series on-line data warehouses.

The project affects the processes related to appropriation management, the undertaking of commitments, the bookkeeping tasks performed by the appropriation owners, daily liquidity management, as well as the keeping

Chart 1

MODULES AND USERS OF THE BUDGET MANAGEMENT SYSTEM

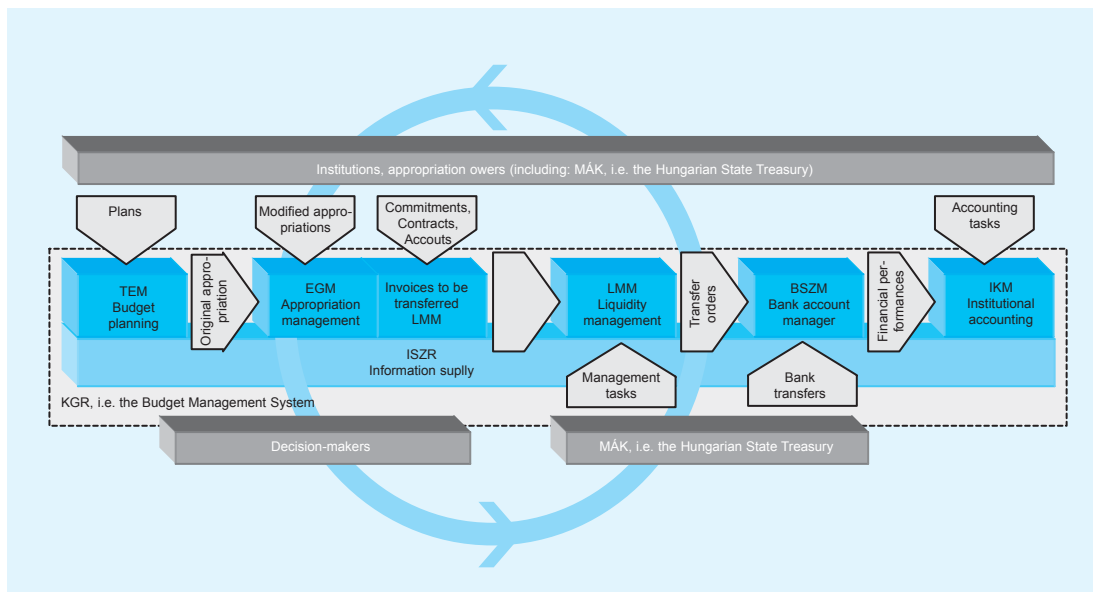
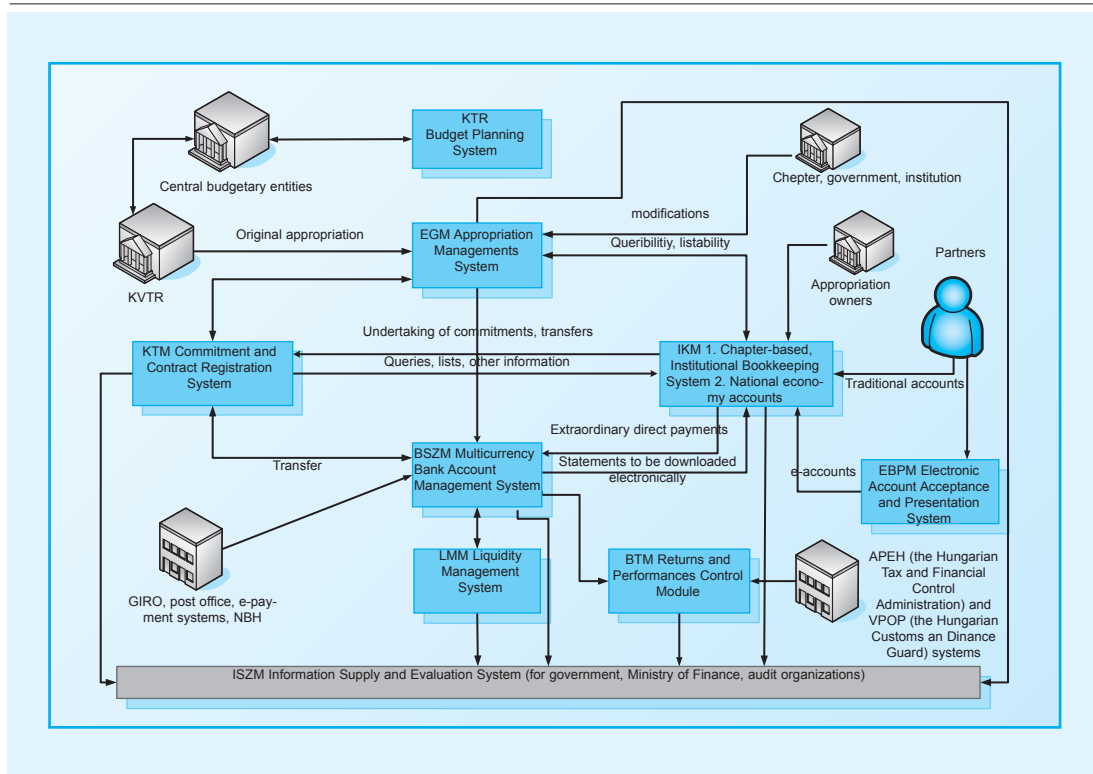


Chart 2

LOGICAL STRUCTURE OF THE MODULES OF THE BUDGET MANAGEMENT SYSTEM



CORRELATIONS

Integration opportunity	To be solved in KGR
Integration of the institutional financial and accounting areas	✓
Integration of the institutional economic tasks and the Treasury tasks	✓
<i>Integration of the institutional payroll and accounting areas</i>	x
<i>Integration of the institutional financial management tasks and the other specialized systems</i>	x

of the accounts of the appropriation owners, and the IT systems that support the performance of these tasks. Thus, the project will result in increasing the performance of state administration and public utilities, in reducing operating costs and rendering administration faster and more efficient. By applying KGR, the current paper-based transaction documents can be replaced by electronic data connections.

The period following the implementation of the project is anticipated to see the following impacts, which may be judged differently from each aspect.

▶ *Better information flow: faster and better-founded decisions*

On the level of the national economy, making the processes of executing the central budget electronic will contribute to the establishment of an efficient state as a service provider and the institutions thereof.

▶ *A more efficient operation of the Treasury*

As a result of the reorganization of the Treasury processes, as well as the simplification of the processes, the isolated systems and the manually produced reports will cease to exist, and the majority of data processing will disappear on both the institutional and the Treasury sides.

▶ *Electronic communication between the Treasury and the clients*

After the implementation of the centralized system, the termination of the practice of phone and paper-based professional administration between the Treasury and its clients and

the introduction of electronic data turnover will also mean significant cost savings.

▶ *Electronic acceptance of invoices*

The electronic acceptance of invoices will also result in considerable savings, as the related administrative burden will decrease as a result of automation.

▶ *Reduction of operating costs*

IT operating costs will also be substantially reduced as a result of the renewed infrastructure, as the maintenance of modern technology requires less resources and even this reduced workload will be managed with a high level of centralization.

▶ *Paper saving*

On-line connections bring about considerable savings on paper, the replacement of paper-based transaction documents and account statements by the electronic form will also mean savings on postal and storage costs.

▶ *Supporting budget planning*

In the course of the uniform, centralized IT support provided to the annual state budget planning process, the well-foundedness of the decisions will improve, the simulations of several versions of the budget plan can be performed at the same time, and the time requirement of the technical tasks will also decrease and this will involve an increase in the amount of time that can be used for performing genuine planning tasks.

▶ *Market concentration*

Instead of the financial-accounting systems that have been freely selectable to date, the budgetary ERP market will be replaced

by a uniform system in the mid-term, which may result in significant savings as consequence of the centralization of licence fees paid to date.

► *More intense supervisory activities*

The information asymmetry between the supporting and the supported organizations will decrease to a great extent, thus a business requesting the government or the chapter for additional subsidies will have more difficulty in obtaining extra resources that are not adequately justified, which is one of the primary criteria of efficient financial management.

Risk factors

The planned project requires increased risk analysis due to its professional composition and volume. Before the actual launching of the project and the completion of the system design, the following key risk factors can be identified.

► *Regulatory environment*

The entire development cycle will be conducted in a field of moving targets, as the placement of government financial management on new foundations and the development of the reform concept of the latter go parallel with the project activities. Thus, in the course of the developments, one should rely on the change management activities to a higher than expected extent.

► *Project size*

The planned developments fall in the category of "highly complex projects". KGR consists of several, relatively independent subsystems, between which, however, there are important system correlations, and KGR as an integrated system also provides some important services. No system of such a size has yet been developed and implemented in a concentrated effort in Hungary but we can rely on international experience in this respect.

► *Professional support*

We regard the task of developing KGR as a specialized economic task in the first place and as an IT task only in the second place. The central modules of the KGR system are to be operated by the Hungarian State Treasury from a professional aspect. The professional competence on the client side is to be available at the appropriate time and place as early as in the period of developments, which means the involvement of extra resources during the project period in order to ensure the smooth performance of the daily tasks of the institution.

► *Implementation risks*

The modules of KGR are not going to be implemented simultaneously. During the migration and implementation of the individual modules, the interruptions that may potentially occur in the institutional and central processes of financial management can be avoided by accurate planning and timing.

POSSIBLE DIRECTIONS OF PROGRESS

According to the concept outlined above, in a few years' time Hungary will see the availability of a Treasury system supported by modern IT technology and a uniform, centralized financial-accounting system governed by the economic events and supporting the financial management and Treasury tasks of the institutions, for the central budgetary organizations. This, at the same time, provides strict control for the utilization of the budgetary funds. However, this opportunity should not be extended to the institutional systems of the local government and the sponsors thereof in the first phase. The reasons for this may include, on the one hand, that the risks of implementation may exponentially grow even if only the high number of such institutions is taken into account, on the other hand, the impact of the central government on this sub-

system can only be regarded as limited, and third, the missing reform of local government-level budgetary regulation appears to be an obstacle as well.

When the system is built, the opportunity for extending the use of Budget Planning System should be created first, and then that of the other modules of KGR, on the basis of further analyses, to the local government sector in the future.

As a new module of KGR, the implementation of an integrated human resources registration and payroll system should also be examined, as the currently used non-integrated solution causes a lot of problems for the institutions.

SCIENTIFIC RESULTS

The implementation of a centralized and uniform system with integrated processes, as well as its comprehensive operation for a few years are the preconditions of the realization of the concept on the budgetary financial management and the state budget planning reform. It is from this experience that various benchmarks can be derived and defined, by using which the further transformations (reform steps) can be planned more precisely.

In the area of public finances, similarly to the modern systems applied in the competitive sector, the implementation of a completely stan-

dardized, integrated corporate governance system still seems to be unrealistic in the mid-term. On the one hand, it is only the central state administration, and perhaps the social security subsystem that continued to be in the focus of the decisions, i.e. the independence of the financial management of the local governments will not be affected by the obligatory use of the Treasury systems in the near future, with a few exceptions. Furthermore, the payroll (KIR) system introduced earlier (but still not comprehensive), as well as the independent human resources system (HR) not related to the payroll system, whose development was started by isolated efforts, will, for the time being, be missing from the scope of the integrated financial management system of the budgetary organizations.

While the saying, according to which the possession of information is a major power factor, continues to be true, we can declare, with increasing conviction, that you can only manage and govern efficiently if this information is shared as well. This means that a single centralized financial management system, rules that are interpreted uniformly, and a management information system relying on a common database may greatly support the efficiency of management at the supervisory organizations of the budgetary institutions (including mid-level management, chapter and government levels).

NOTES

¹ Enterprise Resource Planning

² In accordance with the provisions set out in government decree No. 2118/2006 (VI. 30.) as amended by government decree No. 2255/2006. (XII. 25.)

³ The IKM module in the KGR terminology

⁴ On-line Analytical Processing