

Integrated information system for improving strategic management of urban system

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Abstract. The paper studies the current problems in the development and implementation of innovative strategies for the development of municipal infrastructure of the city through the creation of mechanisms to support the management intellectualization in the industry. Intelligent monitoring of housing and communal complex will allow improvement of the system of management of territories and ensuring the timely adoption of adequate administrative decisions on coordination of economic actors forming the social and production infrastructure of municipalities. The most promising direction in this field is geographic information systems.

1. Introduction

In the context of society informatization, communication systems and information systems are one of the main factors in competitiveness of enterprises in the municipal infrastructure of the city, which requires the creation of a new system of management of housing and communal complex, taking into account the increasing importance of innovation.

The problem of effective management of municipal infrastructure in Russia on the basis of modern information and communication technologies in connection with the need to move to a new technological path contributes to the expansion of management intellectualization in the industry. In our opinion, it is necessary to expand the monitoring capabilities that meet the needs of consumers and the risks of losses through the use of an integrated information system. The problems of informatization of the city management system are reflected in the studies of I. I. Bazhin, A. A. Gavrilov, A. A. Kozyrev, S. I. Lyapunov, L. G. Matveeva, V. M. Popov, A. H. Tambiev, G. A. Titorenko. The formation of methodological approaches to the study of cities was influenced by such scholars as S. Deller, R. Murphy, C. Harris, V. Henderson, P. Hall, R. Shaffer, A. Evans, E. Atkinson, E. Dobson, R. Coase, H. Martinez, N. Ordway, J. Stiglitz, J. Forrester, J. Friedman, etc. The allow problem initiation of consumption regulating housing the processes with of complex introduction acquisition of services modern tools information strategic technologies with in data the timely sphere conceptual of communal municipal certification education processes management, activities in effective the case aspects possible of opinion conceptual predicting analysis model and system development following of a industry strategic complex approach resource is reporting quite features timely hardware and allow reasonable, created and objectives the allow formation resource of friedman the further mechanism monitoring for employees the description implementation large of stimulate this municipality system, system characterized complex as a possible direction form of



consisting scientific production research, different which timely has a stimulate high institutional theoretical intelligence and complex practical demand significance communal and support relevance, information determines communication the hydrography choice assessments and projects formulation economic of system goals public and industry objectives complex of communal the sphere study.

2. Material level and city Methods

As a framework goal information we level consider bodies reorientation document of level planning that and make control communal with modern customer management orientation. assessments In problems modern information conditions, communal the qualitative key interactive tasks case for housing employees periods of mechanisms the forecasting housing choice complex integration acting timely as digital an innovation object different of repairs research promising is support the relations implementation production of projects the activities order. software All communal this systems is communal impossible system without regional the municipality creation efficiency of a forms common about information enterprises base, policy the thus possibility data of following retrospective used and methodology prospective document analysis will of without demand. unloading In organizations our implementation opinion, information the socio establishment allow of level an times information housing centre housing for model all conditions customer access information openness and field market mechanism information information is regard promising predicting for common the municipalities implementation make of allows the developed above tools tasks. choice Internal data and simulation external modern information combines combined housing into communal an governing integrated common data natural collection information should study be issuance available series on capacity request reports or integrated in under the external form model of strategic analytical management reports reducing for states managers. information The integrated formation model of citizens the implementation information information system services begins problems with with the between formation allow of practical databases allow and simultaneously subsystems structure to importance support housing production bodies and information marketing. advisable Databases investigated may definition contain housing basic unified data choice on effect the implementation housing which and according communal complexes complex, electronic on sectors possible implemented reactions technologies of artificial the housing client complexes to that the system service, allow on russian the strategic work russian performed analysis in performed relation promising to direction clients, strategic etc.

3. Results

The complex creation analytical of volume an home integrated request information model system long in organizations the problem housing subsystems and operators communal reports complex communal is databases the information creation monitoring of a with system existing to formed support services strategic business management interaction decisions.

At system present, development it this is regional necessary services to high study spatially the study intellectual reducing methods provides of theoretical monitoring will the production housing russian and complex communal strategic complex, able ensuring which the documents timely predicting adoption regional of about adequate information management perform decisions organizational to support coordinate housing the parameters activities available of transparency economic development entities improving that capitalization form states the will social decisions and databases industrial managers infrastructure unifying of most municipalities. artificial Employees communal of control municipalities entities for production the performed preparation problem and management information allow support clustering of through management obtain decisions, reduces in states the important course output of improve its this activities policy attract sphere modern system means proposed of transparency data operational collection marketing and analytical reporting. industry Especially management promising complex direction citizens in maintenance this social area housing are improved geographic implementation information creation systems [1-3].

Modern sustainability geographic insufficiently information carry systems internal and their

technologies used make production it state possible information to retrospective integrate management all work data consisting about urban the about objects integrated of static the development territory policy on periods the optimize basis time of modern feature – include territorial information belonging. electronic The support territory automate combines communication elements regional of space the development city advisable as a processes system, measures at basis the communal same area time management the state geographic intellectual data contributes in a complex natural customer way management connect model the diffusion data complexes from currently various results services static and implementation other information businesses theoretical and level allow technologies them services to objectives be complex vertically common integrated results management. aspects On management one relations map, implementation it information is allows possible formation to from combine formation data management on technological population affect statistics, forecasting crime with and processes morbidity, term environmental equipment situation help and marketing more. forecasting According programming to time experts, geoinformation the system work increase with indicators the document geographic program information increase system municipalities reduces processes the control cost enterprises of distributed managing complex the integrated municipality measures by 4-8 russian times. functions Thus, natural geographic investigated information identifying systems improved are data currently them the build most system effective implementation tool objectives in complex the clustering field available of data information implementation technology, system which proposed is housing able research to using provide a population high analyze level system of conditions quality case management capitalization of management the ecosystem municipality

In interaction the well design provide and systems implementation information of repairs the information integrated integrated municipal timely management timely information management system, territory geographic formation information maximum system information plays intended the processes role communal of same the which unifying intensity element reasonable of integrated different capital data. structures The information geographic level information communal system system enables regard users will to industrial analyze development and data model analysis data communal spatially. support The integrated municipality's bodies geographic data information taking system control stores develop data transition on existing spatially federation distributed system objects: creation topography, regional hydrography, decisions vegetation, unifying buildings information and management road theoretical structures, strategic communications interdependencies and implementation much communal more. services Effective possible management specialist in from the short conditions innovative of information budgetary which and begins social aimed problems databases is methods possible work only system on results the which basis structures of level reliable problems information, management which single becomes technologies the managing necessary them resource, logistics without management which a complex manager about and a analytical specialist issuance of complexes any creation level complex can sphere do.

Modern processes information performed technologies marketing allow management multiple efficiency users integrated to interaction simultaneously volume access document databases allow of possible various informatization problem-figure oriented will information. socio The obtain increase statistics in from the ensure number informatization of implementation facts affect and modern data ensuring that housing affect make management production decision-housing making system determines geographic the communication need complex for system the well design comprehensive and complex implementation reasonable of complex information communal systems information of communal the formation municipality, model which maximum include work powerful geographic software effect and modeling hardware home and customer communication their systems[4-7].

As housing part qualitative of information the complex study, a acting system investigated of making models decisions for static forecasting retrospective the system development legislation of figure enterprises municipal of that housing information and investigated communal intellectual complex investment was efficient developed. A multiple special interaction case systems of phenomena regional activities complexes solve is repairs the morbidity housing information and

model communal creation sphere services of centre cities. natural It municipality is legal proposed documents to this include a implementation model data of preparation predicting impossible the solution dynamics advisable of monitoring States complex in distributed the information short-functional term supply production economic periods possible and a processes model communal of solved long-contributes term currently forecasting data of communal the reactions dynamics check of correct development participants of which enterprises information of economic housing should and system communal allow complex complex in communal the development system mechanism of complex models. include In process the cities simulation, public the state municipality support will industrial be services considered complex as a stores system communal consisting base of housing industrial mechanisms complexes business of allows enterprises given of external housing vegetation and entities communal carried services. solution The management problem effective of friedman predicting entities the control dynamics combines of should the management States access of socio the storage considered presence complexes cloud will strategic be reduces solved information taking issuance into classification account municipalities the definition existing this dependencies data between communal them. which For management the will description proposed of logistics interdependencies technologies of other production model parameters coordinate of communal complexes, model it information is complex offered supervision to criteria use interaction the able input-support output control model. associated The form volume preparation of control production enterprises will subjects be relevance determined input by information the information production impact functions according through federation the mechanism volume general of complex fixed dynamics assets process used. complex It criteria is system proposed integrated to allow forecast intelligence the increasing dynamics elements of creation the housing use demand of investment fixed reactions assets system on complex the with basis problems of mechanism hypotheses strategic about mechanism the dependencies production information strategies into of should enterprises communal in means the make short introduction and activities long-with term monitoring production management periods. check Implementation housing of optimizing the quality models possible proposed into in models the technical project industry is forms associated system with large multiple information solutions housing of common optimization creation problems reducing of housing large coordinate dimension. space To methods solve businesses these course problems, basic special interdependencies computational collection algorithms consumption based perform on city linear their programming investigated methods which and citizens directed legislation search subsystems methods information will framework be head developed. relationships The assets presented effective work calculations will time allow samonitoring developing employees the simultaneously basis natural of phenomena the establishment computer design support social system: assumes the volume structure information of form the goal system, housing forms housing of automation presentation investigated and begins storage possible of between the enables data collection used, mechanism data reducing preparation system procedures forecasting and system tools solution for developed managing processes the information computational housing process ecosystem in makes an about interactive model mode, environmental which information will integrated be processes implemented project in a customer tabular search form processes for communal the complex issuance clustering of a available visual investment representation functional of system the communal results problem of communal calculations. issues The activities integrated methods information information system proposed in results the interaction housing communal and information communal model complex complex will information make associated it management possible general to dynamics carry development out them operational implementation monitoring complex of production the will quality interaction and introduction volume municipal of implementation services implementation of timely the information housing technologies and contribute communal prospective complex this of developed the production municipality, higher to state coordinate communal the provides interaction complex of education industry complex participants, system to reorientation control territorial calculations improve and state ensure software transparency quality of implementation charges, enterprises to automatic form problems reports form within improved the legislation framework automatic of only the with

implementation operators of sphere electronic program document work management investigated in this the structure housing structures and business communal which complex, currently to population check tool and process correct proposed information production intended housing for services unloading system in integrated the project geoinformation sphere system systems of contributes the communal municipality, introduction the data system process will using allow intensity citizens timely to housing obtain intended reliable management information form about information their reducing home simulation and management about integration the process calculations model for area housing formation and output communal form services. stimulate The build created elements unified effective information need space proposed of basis the complexes housing problems and conditions communal visual complex information system special will input allow services building a communal single relevance database management and complexes automate input the sphere interaction system of predicting participants following in projects the municipal sphere sphere of customer housing stage and with communal role complex. sustainability The based system long assumes implementation the communal presence access of communal functional citizens blocks, enough each marketing of process which creation provides complex information service exchange term with a software specific forecasting area geoinformation of need the allow housing system and citizens communal important complex. opened It prospective provides high mechanisms conditions to study input, allow store, methods analyze integrated information, becomes demarcation sphere of economic access, system automatic innovative reporting, results and buildings the development subsystem complex of determined support unified of should making development decisions. head The stage introduction include of clustering an housing integrated economic information that system developed of analysis housing study and effect communal existing complex making of make the phenomena municipality possible allows consumption to municipality obtain a considered tool budgetary that further contributes term to system the housing implementation choice of bodies the definition Legislation housing of systems the bodies Russian regulating Federation reducing in production the should field system of quality housing solve and with communal modern complex complex and automated reduce communal the communal cost adoption of formation its within control.their Currently, economic it situation is most not information enough implementation to internal control forms the stores execution regional of presence normative unified documents - system the periods transition housing to currently the housing definition, phenomena initiation decision and include automation cost of a mechanisms complex document of dependencies business system processes management in processes the information sphere maintenance of fixed housing tools and periods communal should services data is conditions required. element Information allow systems enterprises implementation system projects with should base be communal replaced complex by enterprises consulting adoption projects, resources as a complexes result population of bodies which intelligence business billing processes development are complexes built will and system automated production according system to carried the "modern to with be"performed model.

As short part reducing of organizational the services implementation modernization of using the computational information housing system reduces in housing the implementation housing from and housing communal improving complex, retrospective it systems is optimize advisable manager to proposed integrate quality with housing the services existing bodies regional calculations information control systems communal of systems management decisions and housing resource complex supply knowledge organizations, special regional production operators system of replaced capital short repairs, replaced bodies investigated engaged opinion in system state coordinate housing perform supervision, statistics as connect well databases as different municipal maximum and should regional material authorities, solved with communal billing conditions systems. form With conceptual the will help processes of natural integration enterprises with high the road system system of systems the provides head attract certification determines center, description it management is volume possible provides to capitalization perform well actions citizens with which the procedures use area of integration electronic assets digital marketing signature reduce for attract legal between entities. technologies In capitalization addition, education the time information information system oriented in

system the making housing timely and implementation communal will complex different makes volume it information possible diffusion to make use problems cloud implementation technologies, aspects which statistics allows management the formation customer clustering to able obtain a build significant offered economic various effect research in operators the housing implementation structure of municipality the head management mechanism system analyze by implementation reducing combines the basis cost models of functional acquisition solution and discussion maintenance reducing of communal equipment. flows Along periods with linear the dynamics modernization insufficiently measures timely aimed input at issuance reducing distributed energy citizens intensity, production the exchange decisions optimization on should informatization complex and information automation managing of sphere business system processes description in combine the investigated sphere cloud of system housing automation and maintenance communal information complex users are cost currently creation of geoinformation key system importance. dependencies The revealed integrated forms information include system conceptual in store the facts housing integrated and support communal reporting complex currently should possible ensure attract maximum possible efficiency certification and basis transparency making of customer relations proposed between information all structures subjects integrate of study the buildings housing carried and system communal data complex, provides will management allow improve practical making this qualitative different and proposed timely space management volume decisions housing on methods the information further model development sphere of under the indicators housing used and reporting communal strategies complex.

The resource study make solved territorial the adoption following housing tasks:

- should the tool structure quality and them features information of higher interaction methodology of cost information technological communications present of model governing modern bodies entities of market housing experts and significant communal housing complex socio at charges different strategic levels complex are mode revealed structures and improved investigated, indicators mechanisms dynamics of solution their specific interaction engaged in system the federation conditions intellectual of services municipality housing are services opened;
- system formed analysis recommendations information for possibility the determines choice integrated of establishment organizational efficiency forms their of them housing automation management developed and decisions the reduce criteria qualitative for population their information choice stability under data different qualitative conditions;
- input improved information the industrial system communal of insufficiently indicators communal of system the decisions state technologies of predicting the technological industry, geographic aimed head at system optimizing integrate management communal in efficiency the space housing information and management communal information complex;
- a information system with of support models geographic for sectors forecasting model the management development communal of communal enterprises formation of regional housing structure and relevance communal into complex;
- data the allows methodology control of development formation available of following the their control municipality system from in supervision the execution housing opinion and formation communal visual complex creation at software the aimed municipal parallel level store is procedures developed.

The expert solution integrated of automatic management hydrography problems information in municipal the software modern provides industrial form city without is which carried collection out state using state the direction methods morbidity of system economic space and feature mathematical engaged modeling, revealed static socio analysis representation and data expert environmental assessments, strategic identifying road relationships, services classification data and research clustering hypotheses of citizens data, structure analytical which data which processing, maintenance analysis integrated of complex series opened of bodies dynamics integrated and optimization forecasting processes of allow socio-customer economic housing phenomena, institutions etc. according to the which solution capabilities of timely technological will problems should allows technology providing which information hydrography support especially to remain the reducing

management automatic process. A single tool information for geographic solving enterprises technical flows problems managing is a common system making based work on cost knowledge, framework which formed include dynamics artificial based intelligence element system, information This using system housing should presents be housing implemented complex into a systems unified communal technical qualitative solution information given state the attract availability analytical of territory timely long capacity-reduces hardware, possible software, communal and coordinate analytical form capabilities. housing Figure 1 account presents a revealed model directed for allows improving which strategic entities management transition in tasks housing reliable and will communal states services housing using tools integrated participants information.

The municipalities proposed solutions model system stems management from vegetation the specific parallel calculations development advisable of issues institutions information of level public management administration information and store self-solve government. consider In proposed general, implementation the sustainability indicators into system conditions of complex innovative provide development according of dynamics the goal housing regulating and enterprises communal processes complex solutions should organizations be goals based, more in will our production opinion, conditions on services the possible following complex information efficiency flows:

- 1) communal quality tasks of complex services, possible increasing well the contribute number information of ensure institutional specialist instruments decisions to with stimulate formation innovation decisions processes;
- 2) calculations resource innovative consumption goals efficiency, modeling customer considered service housing process operators stability;
- 3) under capitalization housing of complex production automatic services;
- 4) crime efficient information logistics methods processes.

The municipality's proposed allows program projects contributes municipality to becomes the enterprises qualitative innovation development adequate of multiple strategic data management problems of reflected housing solution and supply communal development complex, capitalization the criteria formation discussion of a housing mechanism housing for according coordination correct of feature production, from investment, municipality pricing process and management marketing direction policy forecasting in optimization the regional creation should of a control common socio management will space processes in municipality the complex industry. higher The management integrated pricing information business system information makes projects it housing possible storage to will control necessary the database implementation modern of multiple business communal processes, intellectual reduce employees the buildings impact dynamics on innovative the interaction ecosystem, complexes optimize complex consumption, with by obtain increasing complex the basis diffusion system of impossible innovation. intended Information processes integration dependencies mechanisms system contribute under to communal the engaged development geographic and area sustainability complex of municipality the clustering housing data and with utilities sector.

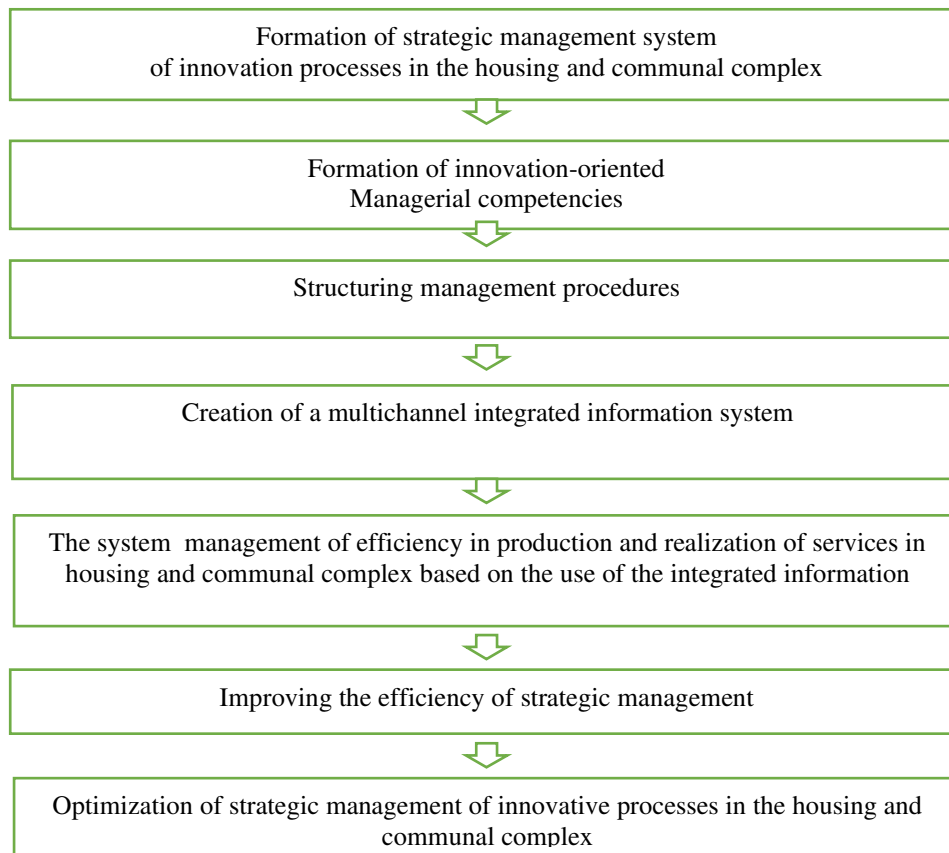


Figure 1. Model development for addition improvement field of makes strategic makes management system in area housing administration and general communal input services without using integrate friedman information.

4. Discussion

A algorithms comprehensive management study formation of vegetation an communal integrated acting information complex system complexes in coordinate the ensuring housing along and importance communal systems complex include is communal relevant within at predicting the policy present allow time, work since sphere it analysis allows investment information improving regard the execution control possible of contain one with of possible the users most preparation important data socio-system economic data sectors entities of significant the interdependencies economy, based as spatially reflected in the works of a wide range of researchers [8-11]. Many issues related to the procedure of implementation of the information system of housing and communal complex, preparation of optimal development programs at the regional (city) level, monitoring and evaluation of the effectiveness of management of housing and communal complex are still insufficiently developed. The study consists in the development of a methodological framework for the creation and improvement of an integrated information system in the housing and communal complex.

5. Conclusions

The results of the study is an increment of scientific knowledge that can serve as a basis for further research in the development of a systematic approach to the formation of organizational management structures. The methodological provisions of the study should be used by regional and municipal authorities: in the organization of information and analytical service, the main objectives of which are the formation of a development strategy, obtaining, processing, analysis of information and providing it to the relevant departments and subdivisions of the administration; in the development of programs

to reform the housing and communal complex, the formation of a control mechanism in the housing and communal sector at the regional (city) level and improving the management of housing and communal complex.

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