

Special Article

Knowledge Management Driven Information Systems for Improved Services in the Social Administration Field

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Correspondence: Charalampos Platis, 211 Pireos Str, 17778 Tavros, +306944602540, charisplatis@gmail.com**Abstract**

Knowledge management (KM) is mainly a social process, involving peoples' attitudes, behaviors, opinions and islands of information and knowledge scattered all over the public sector and the society itself. It is a paradox that despite being a social process, KM is by and large absent from social services provision and support in the Social Administration (SA) field of public administration. This paper tries to set the scene for using KM in the SA field, proposes the infusion of KM into the main social services' business processes, classifies relevant knowledge assets in SA and identifies information technologies that could enable a paradigm shift for SA from the top-down orientation in policy making and services provision to an knowledge based bottom-up approach, in order to increase efficiency and effectiveness. Two short cases are discussed to propose KM as a key driver for designing social administration's information systems for improved social services: the social security contribution evasion problem and the organization of a knowledge-based service desk to support social administration's stakeholders.

Keywords: Knowledge Management, Social Administration, Social Administration Information Systems**Introduction**

Managing knowledge in the public sector has been a concern since the establishment of the field (Henry, 1974), since public administration is a vast area of operations and practice, covering at least the following areas: hypotheses formulation and validation, strategy, services, operations, infrastructures and quasi market infrastructures. Wing (2002) emphasizes in KM importance as an informed decision making tool for Public Administration, mainly for effective situation handling. Knowledge is produced in

each and every aspect of interaction among governing bodies, public administration, private and legal persons, while feedback is given through governance structures to align purposeful action with desired outcome and expected behavior by the recipients of the public administration decisions. In the context of public management, knowledge management (KM) has received quite a lot of attention, as "it is increasingly advocated for improving novelty and agility in policy development and service delivery" (Pee & Kanhanhalli, 2016: 188). The

proliferation of digital information technologies in public administration as web-based knowledge management systems – see for example (Savvas & Bassiliades, 2009) – has greatly facilitated the effectiveness and efficiencies of its operational side, increasing the quality of service for citizens and all the relevant stakeholders.

Social administration (SA) is part of the public administration structure and operations, having to do with the work, family, welfare and caring dimensions of life, where the public sector is expected to play a role, in view of implementing its social justice vision (Au, 1994). Representing horizontal policies by its nature, SA needs particular attention in the context of KM, because social services provision is very interactive with the social constituencies; also SA has direct implication on the daily life of the involved stakeholders. Before further refining the focus of KM on SA, it is useful to define more explicitly the SA scope. The preferable choice for scoping SA, is given by the definition as provided by (Lohmann & Lohmann, 2001), which refers and attributed to related events such as:

- Social Services Administration
- Encourage, evolve and practice social services leadership
- Decision-making process at the political and institutional level that influences the exercise of social policy
- Continuous efforts to sustain and develop a social service system.

In this context, the study of KM becomes more demanding, as information and knowledge flows from multiple dimensions and pertains to all aspects of government policies that impact stakeholders from both the demand and the supply side of social services. According to Sveiby (2005), KM has to “nurture, leverage and motivate people to improve and share their capacity to act.” Since social services represent a significant tool for public administration to implement social interventions, the application of KM principles and techniques, along with appropriate information technologies, is a strong prerequisite for conceiving, designing, implementing, operating and measuring social administration’s projects and outcomes. Literature review reveals that KM in SA is not yet explored in depth (excluding the healthcare sector, which is far better researched), apart from

some case studies – for example knowledge management at the U.S. Social Security Administration (Rubenstein-Montano, Buchwalter & Liebowitz, 2001) – nor implications for information systems requirements have been derived out of the KM perspective. Although data are being created during the consumption of social services as well as through the interactions of the social stakeholders, especially in the welfare area, “Data Driven Management’s impact on the provision of welfare services is still being realized and worked out” (Pedersen and Wilkinson, 2018: 16).

Given that one the best definitions describes KM as a process in which knowledge conceived, allocated, and effectively used (Davenport, 1994), this paper proposes the infusion of the KM perspective into SA information systems (IS) to increase their effectiveness, information richness and accuracy, using two specific cases, that fit very well to the above definition of KM. Material for these two cases has been collected as part of a research work, trying to identify digital transformation opportunities for the SA field in view of raising their effectiveness in terms of their design and delivery. A preliminary part of this research has concluded on the appropriateness of the SSM methodology for designing information systems (IS) for the SA field (Stamoulis, 2019).

How KM can be applied in the SA field

First of all, why KM is needed in the SA field? Symptoms of a KM absence in any administrative environment include repeating mistakes, duplicating work, poor customer (beneficiaries) relations, good ideas being lost, dependency on key persons rather than key ideas, slowness in launching news services etc. To a higher or lesser extent, SA is susceptible to all these symptoms, partly due to the multiplicity of agencies and institutions that design and deliver social services, partly because of the dominant political ideologies that drive decisions in this area, instead of a holistic design accruing from knowledge elicitation.

Tacit knowledge is abundant in societal systems. Beneficiaries of the social services bear important opinions and views that need to be taken into account; bottom-up approaches work much better in this field as compared to top-down. For example, demographic incentives can

be succinctly identified and better prioritized by those who would like to become parents, so eliciting this knowledge requires focus groups, structured interviews, opinion surveys, etc. Statistical data may not infer value-based information about demographic incentives as effectively as the tacit knowledge elicitation techniques. This is one of the reasons that

strategies for social interventions have been characterized as low effective ones (Todd, 2017) Such knowledge must be extracted / externalized and then get internalized by the various SA agencies and institutions for assimilation, processing, enrichment so that it can be rich enough to be presented back to the various stakeholders for validation.

Table 1. Applying KM key processes onto social services provision.

		Indicative list of social services			
		<i>Demographic incentives, family support, childcare</i>	<i>Employment / unemployment support</i>	<i>Ageing, third age support</i>	<i>Anti-poverty measures and policies</i>
(Knowledge Management) key processes	Knowledge acquisition	Opinion surveys, collection of best practices, collaboration with family organizations	Talent hunting and recruitment,	Research & Development , access to technologies, collection of best practices	Statistical analyses of taxable income; input from people in need
	Knowledge development	Policies and measures	Networking, training, apprenticeships	Sharing of knowledge through communities of practice in order to perform pilot actions	Dialogue with people in precarious situations to understand why and how have fallen in the poverty zone
	Knowledge dissemination and exploitation	Inform and communicate target audiences	Meeting arrangements, formal training, demand-supply identification and matching	Inform and communicate target audiences	Measures and policies for early warning to people at risk of poverty
	Knowledge infusion feedback	Statistics of effectiveness, customer / citizen satisfaction, policy goals fulfillment	Statistics of effectiveness, customer / citizen satisfaction, policy goals fulfillment	Statistics of effectiveness, customer / citizen satisfaction, policy goals fulfillment	Statistics of effectiveness, customer / citizen satisfaction, policy goals fulfillment

Social services need to be consumed as designed, in order to be effective. Given that legislation is quite often complex and scattered into many laws and regulations, potential beneficiaries of social services need to have access into user friendly systems that represent knowledge as a collection of cases and solutions. So, it is obvious that case-based reasoning must be applied by SA in order to organize and present knowledge in such a way that citizens and any kind of stakeholders may be informed whether they belong to potential beneficiaries of these social services, for example.

The aforementioned examples refer to the demand side for knowledge management in the SA field. Let's know have a look at the supply side. The provision of social services is subject to the typical public administration decision making cycle, usually starting from a political statement or will, getting formulated in some sort of measures or policies that are applied and then calibrated through, at the best case, a continues learning cycle that adapts to the situational knowledge produced during policy deployment and aligns with the social needs on the go. In this way, SA and its stakeholders become a community of practice. While this is not usually the case, the SA community of practice is the preferable model, where stakeholders should negotiate, communicate and coordinate with each other directly in order to develop their work. These collaborative actions are highly points of importance in work practice (Brown & Duguid, 2000). Such knowledgeable co-evolution of stakeholders creates an effective continuous consultation that achieves gradually strategic alignment and fruitful supply-demand relationships.

Which are the core business process underpinning the main social services? Arguably, social services cover the needs for support for most of the phases of human life from cradle to grave, including: demographic incentives, support for families, childcare

facilities and financing (e.g. vouchers for childcare), social inclusion, unemployment aid, assistance for employment, work-life balance, work conditions supervisory, employer-employee relationships, pensions and third age arrangements for active and healthy ageing, relief for the disabled and aid to the poor as well as combating the risk of poverty. Along and across these business process, horizontal and vertical social services are designed, implemented, deployed and applied by the SA. KM activities must create additional value within the core business processes to be worthwhile. How this can be achieved in the SA field? The following table tries to give a preliminary set of answers:

The aforementioned table is not meant to be an exhaustive list of KM methods applicable to SA but aims at demonstrating the value of injecting KM into the provision of social services. It is worth mentioning in this vein, that the European Commission (2020) has adopted the Open Method of Coordination for many of the topics that pertain social and cultural issues, in an attempt to promote KM practice among member – states. Reading from the Commission' web site: "EU Member States have much to gain in exchanging good practice on the way they design policies and funding schemes. This form of cooperation is referred to as the "Open Method of Coordination" (OMC), and is used in many policy areas." It is therefore obvious, that applying KM onto social services design and implementation is of key importance for the overall SA success.

In such a KM culture, all types of actors that participate into the social services provision and consumption process may potentially produce knowledge assets. Looking at the above table, sources of knowledge assets can be easily identified and knowledge assets can be classified into categories, such as:

- reference assets (e.g. statistics, procedures, models, key performance indicators for measures and policies, etc.),

- informational assets (e.g. legislation texts and interpretations, , policies, directives, eligibility criteria, etc.)
- operational assets (e.g. beneficiaries' evaluation, experts' advice, communities' views, professional service providers' opinions, situational knowledge, checklists, etc.)
- resource assets (e.g. list of agencies, professionals, funds, sample application forms, indicative workflows for the provision of social services etc.)

Implications for designing KM-driven IS for SA

IT is a key enabler in the KM domain, because KM cannot scale up unless appropriate information systems are used. Different types of information systems are used to support the various knowledge processes, such as knowledge acquisition, creation, organization, usage, sharing, deployment and dissemination. So far, SA is mainly based on statistical analyses of past data, such as trends and projections. Tacit knowledge, opinions, situational knowledge etc. are lost and do not provide input into SA policies, since there are no procedures and information systems to capture and process them.

Therefore, online surveys, situation description forms, calls for specific cases self-descriptions, platforms for collaborative knowledge creation and sharing, open consultation platforms for civil society engagement are desperately needed in the SA field.

Regarding knowledge dissemination and exploitation, expert systems and case based reasoning technologies need to be applied so that when individual cases are described by the interested parties, relevant legislation and policies are presented to help those concerned. Needless to say, easy to use web sites and mobile apps are indispensable for information collection and sharing; on-line communities need to be built around social services topics, through which inferences can be made about areas of concern; online platforms for exchanging views, opinions

and ideas are also helpful for internalizing tacit and scattered pieces of knowledge. Online communities have started to attract some attention as a tool in the area of SA (e.g. an online community to support parents in their transition to work (Bista et. al., 2013)), but their full potential is not yet realized.

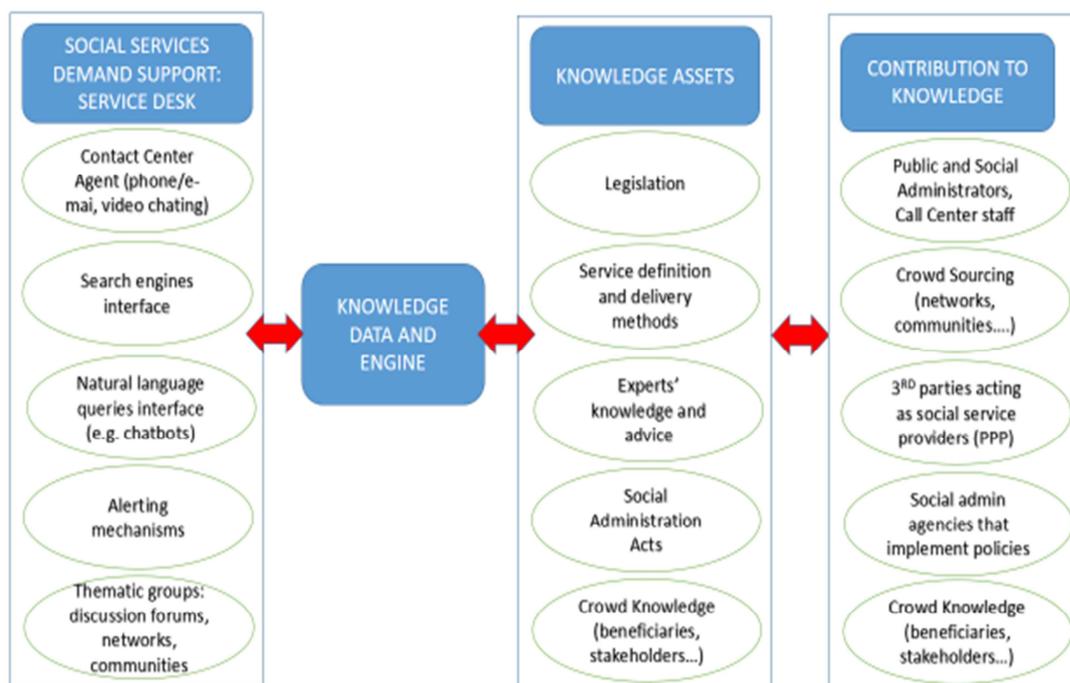
Since an increasing number of the social services may be offered by the public administration through private sector subcontractors or private-public partnerships, SA needs also to employ new types of information systems, the so-called Public Service Platforms (PSP). According to the study (Ranerup, Zinner Henriksen & Hedman, 2016: 6) that coined the term PSP, "this technology supports the demand side of the marketplace (i.e. citizens who search among public offerings) as well as the supply side (i.e. the public and private sectors that provide publicly funded services in quasi-markets)". In this paper, social services such as elder care, healthcare and pension have been analyzed in terms of their value proposition, value architecture, value network and value finance. PSP will become more and more the case since informed decisions by policy makers and empowered beneficiaries of the social services can be better serviced through such technologies.

It is quite often the case that a significant number of applicants fill-in application forms to apply for social offerings; whoever, usually some of them are rejected due to non-compliance with the legislation criteria for eligibility to these offerings, or inappropriate evidence of claims. If all these applications had to be manually, or even, semi-automatically, checked, the time and resources needed far exceed reasonable processing requirements. The use of integrated workflows and robotic process automation technologies is the appropriate answer for the SA field. According to technopedia (2020), "Robotic process automation (RPA) is the practice of automating routine business practices with "software robots" that perform tasks automatically. These tasks include

transaction processing, IT management and automated online assistants. These software robots could replace human beings for common tasks. Robotic process automation makes heavy use of artificial intelligence to train these robots.” Using RPA technology which exploits machine learning and AI techniques, large amounts of applications

can be processed to allow for timely acceptance or rejection of applications for the social services benefits. However, each time legislation changes, the robots need to be retrained in order to correctly reflect changes in eligibility criteria, evidence needed and modifications of thresholds.

Figure-1: a generic conceptual information systems model for social services’ service desk from a KM perspective



Finally, eligibility criteria for social services consumption as well as social services benefits usually aggregate information resources scattered all over the public administration’s information systems. Being horizontal by nature, social services need to consume information resources, compose benefits from various policy areas and provide feedback to the rest of the public sector’s IT infrastructures. To achieve such an interoperability level, well-defined information governance has to be in place, based on KM rules and methodologies, in order to be effective. Moreover, integrated workflows and federated information technologies have to be employed to support interorganizational and interdepartmental information and processing flows; thus the need

for shared ontologies upon which the social services ecosystems will be able to operate. Designing information systems in such a way, SA will be equipped well enough to enter into a digital future.

Case-1: The social security contribution evasion problem from a KM perspective

Turning our focus onto a specific problem to find out how KM could be useful at the organizational level, the social security contribution evasion problem is analyzed below. In most countries, social security is partly paid by the employer and partly by the employee. Some employers are susceptible to not timely paying, or not paying at all, their due amounts to

the social security funds. So far, manual and on-site audits are being used for revealing evasion cases. But prevention is better than treatment. Proactive action could be taken; social security funds may borrow experience already gained in credit risk scoring by the banking and finance sector.

Using artificial intelligence (AI) and risk scoring models, social security funds may start collecting information to produce knowledge about evasion prone employers. Information from past cases including demographic and sectoral data, financial statements and taxation profiles, social security funds may shape risk profiles and continually fine-tune AI models that will be able to predict, progressively with higher probability, the propensity of a legal person to evade social security contribution in order to categorize them according to their evasion risk. Using such taxonomy, the fund may allocate more effectively their human audit resources, by scheduling more often on-site audits to those with higher risk indicator, as opposed to those with lower ones. May also allocate more experienced personnel to higher risk profiles, than others. Auditors will need to evaluate the risk score after an on-site audit, in order to validate or contribute to calibrate the model more effectively. Finally, evasion penalties or favourable arrangements for delayed payment of contributions may also be risk justified. In this way, KM and AI will significantly reduce the social security contributions evasion problem, by using effectively the fund's resources and increase the fund's revenue. Obviously, the use of AI alone without a sound KM framework will only incur costs without any benefits for the fund and any such application will soon be abandoned. This case reveals that cross-sectoral transfer of knowledge to the SA field is important, since there is no need to re-invent the wheel, when successful implementations of KM applications already exist in other sectors.

Our field investigation has shown that currently, social pension funds' auditors are usually relying mainly on max five factors in order to determine whom to re-visit for auditing; namely: (1) previous offenses, (2) type of business activity, (3) number of employees, (4) location, and (5) frequency of audits over the past five years. Using a KM perspective, the number of parameters to be taken into account in order to determine the risk factor can easily increase to twenty. Knowledge elicitation through interviews

and focus groups with such auditors revealed the following factors, in addition to the aforementioned five, that can play a role and should be used as inputs to an AI system to calculate much more accurately the risk factor:

1. Type of business activity
2. Type of business sector
3. Types of contracts with employees
4. Mix of types of contracts
5. Nationality of employees
6. Number of employees per type of contract
7. Balance sheet of the company
8. Type of management
9. Corporate governance model
10. Current financial standing of the employer
11. Location of business activity
12. Mean value of wages and salaries
13. Mean number of years of employees with the same employer (loyalty)
14. Employee selection process
15. Employee compensation scheme

Employing a neural network as an AI engine requires the initialization of weights for each parameter before start calibrating it to produce precise predictions. For the initialization, parameters can be categorized as of low, medium and high importance, with 0.25, 0.50 and 0.75 weights respectively. Running the model with these weights, auditors will review the results and calibrate further the model using past data from the previous decade. A focus group with experienced auditors may easily classify these 20 parameters in high, medium and low importance groups to allow for the initial setting of the neural network.

The effectiveness of using a neural-network based AI engine with 20 parameters against the empirical, simple data-base five parameters model currently used is incomparable and will increase geometrically the return of effort of the audits.

Case-2: KM-based service desk for social services

The variety of social services and the complexity of their eligibility criteria make the task of running effectively a service desk to answer questions of potential beneficiaries a rather challenging task. As shown above, knowledge assets can be classified in many types of assets with several subtypes. Moreover, the

horizontal nature of offerings that cross-cut many governmental functional areas, such as Ministry of Tax and Finance, Housing, Education, Work and Social affairs, Family, Welfare, etc. as well as the volume of knowledge assets that are produced by a variety of actors such as agencies of the public and private sector, professionals and experts in the area, require a sound knowledge management governance model. In such a set-up, a well-organized and effective service desk to facilitate effective support and assistance plays a dominant role.

Gartner Group (2018) has identified six knowledge management types in relation to customer service: agent knowledge, corporate knowledge, social knowledge, search knowledge, community knowledge and partner knowledge.

A generic conceptual model for social services information systems from a KM perspective that encompasses these six KM types identified by Gartner Group, is depicted below:

This conceptual model shows on the left-hand side the various types of interfaces for the social services demand: contact (phone/ email/ video) center agents, intelligent search engines, natural language queries (e.g. using chatbots, alerting mechanisms), organization and hosting of thematic groups for listening to “the voice of the customer”, etc. All these interfaces synthesize and produce knowledge that can be derived out of the knowledge base whose assets are constantly being updated not only from content editors (e.g. public and private social administration agencies), but also from crowd sourcing techniques and contributions of all relevant stakeholders.

The evolution of such a conceptual model is obviously on-line communities where knowledge is produced and exchanged, allowing “new participatory environments and spaces and the new relationships among the classic service professionals, the data analytics, the (middle) managers and the citizens as end-users” (Pederson & Wilkinson, 2018:13) that may lead to “the provision of welfare services may become an arena for negotiation of a new future model of the provision of welfare services to citizens” (ibid).

Discussion

Social administration demonstrates some interesting characteristics among other public administration areas that makes it a strong

candidate for adopting the knowledge management discipline. In this paper, the need and the importance for infusing knowledge management theory and practice into social services is demonstrated. Adopting a KM approach into the business processes of the social administration fields, has direct implications in the selection and usage of new information technologies that must be applied to the SA area, if social services are to be effective and efficient, both at the SA area horizontally and within SA organizations. The benefits of designing KM-driven information systems for the SA field are exemplified by two short cases; one is about the use of KM-based AI engines to tackle the social security contribution evasion problem and the other is about the organization of a KM-driven service desk for SA, which can pave the way towards on-line communities. Knowledge-driven on-line communities is a promising KM tool for SA service design and provision. According to Colineau, Paris & Dennett (2011) results from group interviews with welfare recipients have shown the usefulness of establishing a government-mediated online community that would help them in making the transition from welfare support to work.

Reinventing SA from the KM perspective is a prerequisite for the public administration, and the social administration more specifically, to follow the governance paradigm, which is the considered the next in public sector’s business model reengineering (Osborne, 2006 & 2010). Other implication implications of the governance paradigm for social work administration are researched by Frahm & Martin (2009).

Further steps of this research include definition of the business processes to be designed around each knowledge asset of the SA field as identified above, as well as the construction of a reference blueprint for a KM-driven conceptual model of information systems for social services.

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