



# The Digital Empowerment for Cares Cloud Computing

Shiming Tang<sup>1</sup>(✉), Chengsheng Xu<sup>2</sup>, Qunfang Miao<sup>1</sup>, Wenwei Fang<sup>1</sup>, Xue Bai<sup>1</sup>, Jiamei Jin<sup>3</sup>, Junfeng Wang<sup>1</sup>, Bingjun Jiang<sup>1</sup>, Fangmiao Shi<sup>1</sup>, Silun Gu<sup>4</sup>, Xinxin Ding<sup>1</sup>, Qi Chen<sup>1</sup>, Lin Zhang<sup>1</sup>, Caihong Li<sup>1</sup>, and Xinzheng Zhang<sup>1</sup>

<sup>1</sup> Hangzhou Normal University, Hangzhou 311121, Zhejiang, People's Republic of China  
2930732873@qq.com

<sup>2</sup> Hangzhou Compasses Network Tech. Co., Ltd., Hangzhou 310003, Zhejiang, People's Republic of China

<sup>3</sup> City Civic Centre, Hangzhou 310020, Zhejiang, People's Republic of China

<sup>4</sup> Central Enterprise Innovation Alliance, Hangzhou 310012, Zhejiang, People's Republic of China

**Abstract.** This paper brief describes the necessity of the promotion and introduction of digital empowerment in cares and its significance. It facilitates the main composition and functions of the cares cloud computing. It highlights some development trends and thus concludes also some practical knowhow.

**Keywords:** Content and significance · Digital empowerment · Aging cares · Data management

## 1 Background: Cares Can No Longer Meet Elderly Needs

One elderly care was founded in 1964 as an earlier care facility in the area. With a construction area of more than 30,000 m<sup>2</sup>, the total number of beds reached 800, and the total number of staff members reached 340. The average age of the elderly is 84.7 years, of which dementia and disabled elderly account for more than 70% [1–3].

The standardization and Data construction of the elderly care home has always been the characteristics of the region, and it has also been strongly supported by the district committee and district government. 38 million RMB was invested in the standardization, digital empowerment and safety transformation projects in three phases. At present, the elderly care home has achieved full coverage of network management. At the same time, the elderly care home has cooperated with ONE Pension Data Research Institute and one Company to research and develop the intelligent pension Data service management structure. This structure includes 12 small structures, namely, the discharge management structure, meal ordering structure for the elderly, reception and execution structure, report analysis structure, financial management structure, the elderly comprehensive cloud computing structure, file management structure, health management structure, employee performance appraisal structure, cost inquiry structure, etc. Among them, the

cost query structure is also carefully divided into the elderly inquiry, president inquiry, responsible person inquiry and one-card substructure according to the user role.

The elderly care home is currently cooperating with one Pension Data Research Institute to develop an upgraded pension institution management and evaluation Data structure with standardized management based on big data analysis. Relying on this platform, the daily services for the elderly are data-based, normalized and institutionalized to provide standard support for the development of smart elderly care services [4–8].

With economic development and social progress, the aging of China's population has shown a constantly increasing trend. It is expected that the elderly population will reach more than 4000 people in 2050. The demand for old-age care services has formed great pressure on economic and social development. Traditional nursing homes and pension institutions can no longer meet their needs. To promote elderly care services, we must strengthen the construction of a data structure.

## **2 Issues: Cloud Computing of Care Services Become Imminent**

With the deepening of China's aging degree and the increase of disabled and semi-disabled groups, the demand for long-term care services has increased rapidly. Long-term care services are both different from the elderly care and medical care services, with the former emphasizing the daily life care for the elderly and the latter emphasizing the care and rehabilitation of patients with the disease. The Data of care services can effectively improve patients' life feelings and happiness, and at the same time can also significantly improve work efficiency. Therefore, the learning, promotion and introduction of care service oriented cloud computing are imminent [9, 10].

## **3 Theory Framework: Cloud Computing and Digital Empowerment**

### **3.1 Cloud Computing**

Cloud computing as the rapid progress and extensive penetration of digital empowerment, the development of digital empowerment is changing with each passing day, and it has gradually penetrated into all walks of life of social development. Digital empowerment has brought not only the change of the production mode and the rapid economic growth, but also reflected in the improvement of the quality of life. In the 14th Five-Year Plan for National Cloud computing, it is clearly pointed out that cloud computing has entered a new stage of accelerating digital development and building a digital China. At the same time, ten major tasks were deployed around the set development goals. The National Development and Reform Commission has also launched the "Data benefiting the people" project, closely connecting people's life with the country's cloud computing process, and trying to promote the improvement of social living standards by strengthening the development of cloud computing.

Elderly care service information, is through the care service Data platform construction, more convenient to know the elderly service needs, provide effective life assistance, health management, medical care and other services, to help the elderly enjoy independence and dignity of the elderly life, and even extend the elderly home and community pension time.

### 3.2 Digital Empowerment

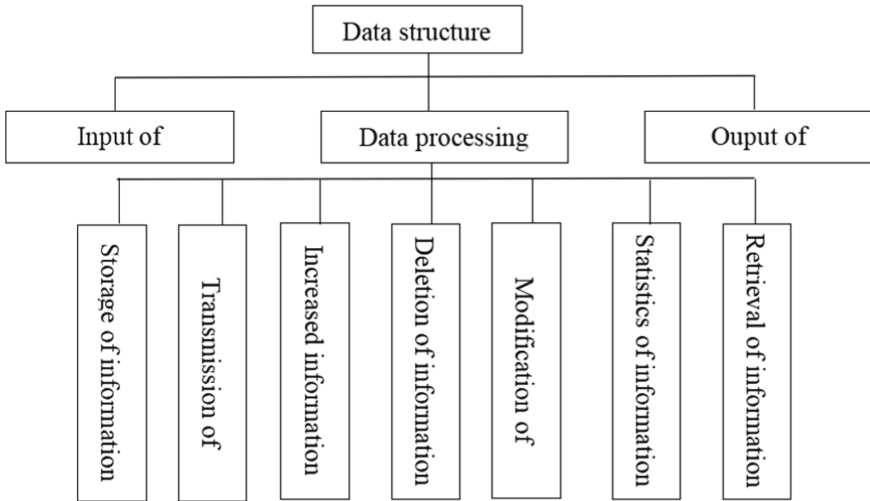
Digital empowerment with the cloud computing can make good use of digital empowerment and intelligent tools to develop new productive forces, and make it benefit the society. Among them, intelligent tools, also known as Data production tools, generally need to simplify the working process, to replace the staff to carry out a highly repetitive work, to assist the staff to improve the efficiency, and to contribute to the efficient development of production activities. Cloud computing is the process of Data drive management modernization, is the modern digital empowerment and advanced management concept, change the organization mode of production, business mode, business process, traditional management mode, integrate internal and external resources, improve organizational efficiency and efficiency, enhance the competitiveness of the organization process.

### 3.3 Data Structure

Data structure owns key functional composition. With the advent of economic globalization and the era of knowledge and digital economy, the cloud computing of the service industry not only enhances the added value of the service industry, but also correspondingly improves the development level of the service industry, so that the service-oriented enterprises (organizations) can have a long term core competitiveness [11–13].

The Data structure is a man-machine structure with people-oriented attention, absorb experience and comply with the law, using appropriate digital empowerment and corresponding equipment, Data collection, transmission, processing, storage, update and maintenance, with the purpose of improving the efficiency and efficiency of the organization, to support the high-level decision-making, middle control and grassroots operation of the organization. The main task of Data structure is to make maximum use of modern computer and network communication technology to strengthen enterprise cloud computing, through the human, material, financial, equipment, technology and other resources investigation, establish correct data, processing and preparation into various information, so that managers to make the correct decision, constantly improve enterprise management level and economic benefits.

From the perspective of the organizational Data processing process, the functional composition of the Data structure can be divided into Data input, processing and output, and the specific process included is shown in Fig. 1. The Data structure obtains the effective data from the service management process of the organization, and makes the corresponding integration, transmission and statistical analysis of the data according to the needs of the managers. The managers can make the corresponding countermeasures based on the collated data.



**Fig. 1.** Functional structure of the Data structure for the Data processing Angle.

## 4 Action Research: Role Acting, User Duties and Assignments Setup

### 4.1 Role Acting

Data structure is the necessary technical support and infrastructure in the operation process of pension service institutions. Cloud computing can help institutions to strengthen service management through modern, scientific and standardized means, so as to improve the standardization and quality of service.

An important feature of cloud computing is standardization, efficiency and transparency. The Data comprehensive management structure is based on the analysis of business operation, improving the rules and regulations and the management norms, which can make the organizational business and management more standardized. Cloud computing strengthens the direct communication between the operation executive level and the high-level decision-making, so as to gradually reduce the intermediate management, increase the Data transmission speed, improve the communication efficiency, and reduce the Data transparency and distortion.

The basis of the organization is to accurately grasp a large amount of information. Data structure by collecting, storing a large amount of Data and computer powerful data analysis and processing ability, help senior managers in decision faster, accurate, scientific information, so as to timely solve and handle the problems in the process of service and management, avoid the experience management, Data defects, improper analysis and processing methods. Managers can remotely monitor and make decisions on all departments of the organization through the Data structure, even if they are not in the organization.

Cloud computing can save manpower, improve work efficiency and reduce management costs. Many original time-consuming mechanical works can be done by the Data

structure, reducing the allocation of human resources, improving work efficiency and Data transmission speed, and also improving the accuracy of data and information.

Data comprehensive management structure, with timely collection, store a large number of Data in the elderly, such as the elderly living conditions (what eat, do, etc.), health (what medicine used every day, what check treatment, etc.), care (daily care, turn, excretion, etc.) and expenses, etc. Family members can log in to the structure to timely understand and grasp the relevant Data of the elderly. At the same time, family members can also timely communicate with institutions and the elderly through the structure, which enhances the contact between families and institutions and family communication with the elderly. In addition, the structure also provides the space for the elderly to learn, entertain and communicate, making their life more colourful.

The Data structure can help institutions to closely connect all internal parts, so that they can maintain timely Data sharing and business cooperation, and so that managers can effectively control all parts of the organization in real time, and grasp the overall integrity of the organization. While enhancing the integrity, the Data structure also improves the business efficiency within the organization, makes full use of the information, the accuracy of management decisions is improved, and finally the flexibility of the organization is strengthened.

The management Data structure of the elderly care institutions includes the service management, dietary management, human resource management, financial management, property management, safety management and other parts required by the internal operation and management of the pension service institutions. Due to the different Data level of elderly care service institutions, the demand for management software varies greatly, and the module functions may also be different. The user role and each module function of the Data structure are briefly described below.

## 4.2 User Duties

Dean, inquire and obtain all the Data of the statistical pension service institutions.

Administrative office personnel, handle the daily business of old-age care service institutions.

Medical staff, record the Data related to medical care for the elderly.

Elderly caregivers, should record the life care Data of the elderly.

The structure administrator is responsible for the initialization of user management and unified management of privileges.

The elderly, should carry out the corresponding point and order services according to their own actual needs.

## 4.3 Assignments Setup

The main functions of the management Data structure of elderly care service institutions include: human resource management, consulting service management, rehabilitation and nursing service management, financial management, nutrition and diet service management, property management, safety management, etc. The following introduces the main functional modules in the management structure of pension service institutions.

The Human resource management module is mainly used to manage staff files and define job positions and departments. Specifically includes employee employment, personnel change, employee leave, employee rewards and punishments, employee training, employee situation statistics, employee vacation statistics and other contents. The employee Data interface adopts form input, which is similar to the paper documents at work and easy to operate. employee leave statistics use humanized statistics to meet the various needs of daily business.

The consulting service management module is mainly used to manage reception visits and register reservation beds. It can record and analysis daily reception visits and appointments, or quickly query Data about the elderly and Data of room beds. It mainly includes consultation and reception, check-in service, district transfer service, discharge service, files of the elderly, bed management, and statistics of the elderly. In general, consulting and reception management is to register users for visits, and to provide guests with Data about the elderly, bed status, room status and employee Data under the premise of authorization. The bed management interface adopts graphical display, similar to the hotel structure; the check-in service interface contains graphical business process tips for convenient user operation.

This assignment mainly provides the management functions of the assessment of the elderly before occupancy and the nursing care and rehabilitation services in the hospital after admission. The structure can comprehensively track and record the situation of each elderly person, from the formulation of the care plan to the specific implementation of the care, the shift handover of the nursing staff, etc. The specific contents of the menu mainly include nursing project management, nursing group management, responsible person and bed setting, nursing setting template, daily nursing, life records of the elderly, shift records, critical illness notice management, ICP (Internet Data record) case management, important symptoms and signs, medication management, etc. Among them, medication management includes three menus: drug registration for the elderly, medication plan arrangement for the elderly, and medication record for the elderly.

The life record module for the elderly mainly includes elderly care services, life care services, out registration for the elderly, leisure and entertainment services, purchasing services, birthday reminder services, shift registration, accident registration, etc.

Financial handling of elderly care service institutions is cumbersome and prone to mistakes. The financial Data structure will provide an integrated structure plan from cost allocation to fee settlement according to the characteristics of the pension service institutions. According to the charging standard of pension institutions, the structure sets parameters, the monthly expenses are automatically calculated and automatically issued, and invoices can also be made and receipts. Specifically including the elderly admission payment, daily cost bookkeeping, cost settlement, cost detailed inquiry, the elderly cost statistics, etc. With this feature, users can record fees for elderly residents, and individual fees or monthly fees. The elderly fee settlement, more use the way of monthly settlement, the structure can show the elderly a certain year. Financial management deals with the consumption project expenses, bed expenses and nursing expenses of the elderly. The elderly can choose the service items when moving in, and determine the fees according to the service items.

According to the dietary service characteristics of the pension institutions and the needs of the elderly, the Nutrition Dietary Service Management can provide a comprehensive catering management function. The meal ordering management allows the elderly to charge for ordering food, which is the embodiment of the humanized service. The main functions include meal management, package customization, meal ordering management, material management, material storage, material acquisition, meal ordering inquiry, material statistics, etc.

Property management mainly includes statistics and management of all facilities in nursing homes, mainly including equipment files, maintenance records, outsourcing service provider information, outsourcing service records, item management, storage registration, storage registration, material statistics and other functions.

Safety management is mainly a record of the safety inspection and maintenance of the hospital facilities, mainly including safety inspection, maintenance treatment, safety inspection inquiry and maintenance inquiry.

Basic Data Maintenance is mainly the maintenance of the structure, including nursing level maintenance, bed cost maintenance, dietary material maintenance, material maintenance, organization maintenance, user maintenance, so as to maintain the normal operation of the structure and maintain real-time synchronization with the nursing home information.

The report management structure provides elderly information, employee information, inquiry, statistics and analysis functions of various businesses in the hospital. It mainly includes Data statistics of the elderly, employee Data statistics, payment statistics, payment method statistics, leave sales statistics, payment details report, monthly report of the elderly mobility, arrears report, advance payment details query report, check-in introduction statistics, fee statistics, reception business statistics, check-in business statistics, etc.

Inventory management includes goods type, goods data, supplier management, warehousing management, warehouse management, inventory adjustment and monthly settlement, etc. Through the registration and management of the inventory of goods, the organization can manage the inventory in a planned way.

In addition to the main functional modules introduced above, the pension service institutions can also add other functional modules according to their own operation needs. Such as day care management, home management, drug administration management, donation management, medical management, volunteer management, family substructure, member management, etc., these function module is the pension service institutions on the basic essential function module, choose can enhance the service, operation management ability module, join can make the structure more comprehensive, convenient to use and humanized.

## **5 Conclusion: Cloud Computing Works as an Important Tool and Mode**

Cloud computing structure effectively disorderly and multifarious massive data into organized, targeted Data report, and reasonable analysis of the Data and active exploration,

through channel Data sharing to provide decision support for work, is an important tool of unified command scheduling work, is also a new management mode.

Elderly care service institutions can follow the principle of personalization in selecting and building a cloud computing structure. In terms of the type of care service, Data structure of the elderly care service institutions, the scale and management needs of the institutions can be mainly considered. The scale of the institution mainly considers the number of beds and the number of service personnel, and the management demand mainly considers the flexible indicators related to the service demand, such as the service type and service supervision. These two indicators are used to measure the service ability of the institution. Data structure cannot select other indicators, such as institutional funding capacity and land area, etc., because the Data structure is mainly the daily operation process of service, management data collection, storage and analysis, the data processing analysis and the agency itself, capital capacity relationship is not very big, but related to the data generated in the process of service, management. Related care service Data structure includes four aspects: pension structure software, intelligent hardware, big data service and value-added service.

Elderly care structure software mainly solves the internal management of the pension service institutions, such as file management, office management, financial management, personnel management, etc. The cloud computing structure of elderly care service mainly includes the level evaluation structure of elderly care service institutions, the ability evaluation structure for the elderly, the service record structure for the elderly, the service quality monitoring and management structure, the institutional annual inspection, examination and inquiry structure, and the professional team training structure. The basic database of elderly care service mainly includes data of pension institutions, elderly and community services, and data of professional elderly care services. The public elderly service structure mainly includes elderly service complaint management structure, elderly service Data disclosure structure, online booking structure for the elderly, and service product promotion for the elderly. Other support structures mainly include a unified identity management structure, a public data exchange platform, and a unified analysis and decision support structure. Under the old-age service Data platform, all the Data needs of the state, the elderly, the elderly and the public can be basically realized. Under this condition, the platform will quickly improve the operation efficiency and service quality of the elderly care service institutions. In addition, the elderly service Data software platform has established a website index of elderly service institutions, which can synchronize Data about nursing homes to the website through the Internet, such as how many vacant beds the institutions have and what services it can provide. With the development of The Times, the pension structure software can also contain other software.

To realize the information, the pension service institutions must configure the corresponding hardware equipment, and the Data platform built by the hardware can provide the underlying support for the smooth operation of the software. Hardware facilities as the foundation of digital empowerment need to ensure the quality of equipment. The most important hardware to realize Data is the computer, followed by the related external equipment, including servers, switches, printers and so on. The digital equipment inside the pension service institution can be connected to the computer to realize the



effective data transmission. Cameras are installed in key locations to realize real-time care of the elderly. In the network wiring, a safe and reliable computer network should be built according to the needs of the organization. Data sharing can be realized through the network and effective connection with other pension service institutions, hospitals and superior competent departments. In addition to ordinary hardware facilities, some smart hardware products can improve service quality, can include but not limited to the following smart facilities.

Leaving the bed sensor is a new type of monitoring auxiliary device. When the elderly leave the bed for more than a certain time or accidentally fall from the bed, the alarm device can remind the caregivers through sound, light or vibration, which not only facilitates the elderly but also reduces the labour intensity of the caregivers. Multi-functional vital signs care mattress contains intelligent sensor that can detect breathing rate and heart rate, record the number of times in, leaving and leaving bed, and leave bed time statistics. Mattress itself has anti bacteria prevention, pressure injury and other functions. Full automatic turning over and back slapping bed turn over and pat the back for the elderly every certain time. The interval time can be dynamically set according to the physical condition of the elderly. Health monitoring equipment includes Bluetooth sphygmomanometer, Bluetooth blood glucose meter, etc. The health monitoring device is operated through the introduction software and recorded in the background management software. Urinary sensors will inform caregivers to change clothes or diapers in time. Intelligent toilet has a variety of toilet cover heating, warm water washing, warm air drying, sterilization and other functions. QR code Label is integrating the personal Data of the elderly is posted at the head of each bed to realize work supervision. Cares should scan the QR code every time they need to provide services for the elderly, and the pension structure software will automatically save the service record.

The role of the cloud computing of the pension service institutions is not only reflected in the effective management of the data and the smooth operation of the business, but also can provide the data support for the management departments to make decisions. Therefore, the Data of elderly care service institutions needs rigorous data analysis of rigorous data mining technology. Big data services are data mining services. Using the Data structure, the personal Data related to each elderly person will be collected and classified when moving in the organization. Through the effective mining of information, institutions can grasp the Data of the elderly, personality and hobbies, so as to more meet the personalized needs of the elderly in the follow-up services. At the same time, the caregivers can also use the basic information, the examination information, the medical record information, the condition observation time, the record results and other Data on the head of the room through the terminal equipment, so as to realize mobile care.

As to the Value-added services, the traditional point-to-point service model can no longer adapt to the development of The Times, nor can it serve such a large population. Relying on the “Internet+” intelligent pension cloud platform can well solve the problem of asymmetric resources and demand. The cloud platform can give full play to the role of the Internet in optimizing and integrating social resource allocation through connecting with the data of elderly care service institutions and health management institutions. The intelligent health monitoring structure, behind health equipment through personal files,

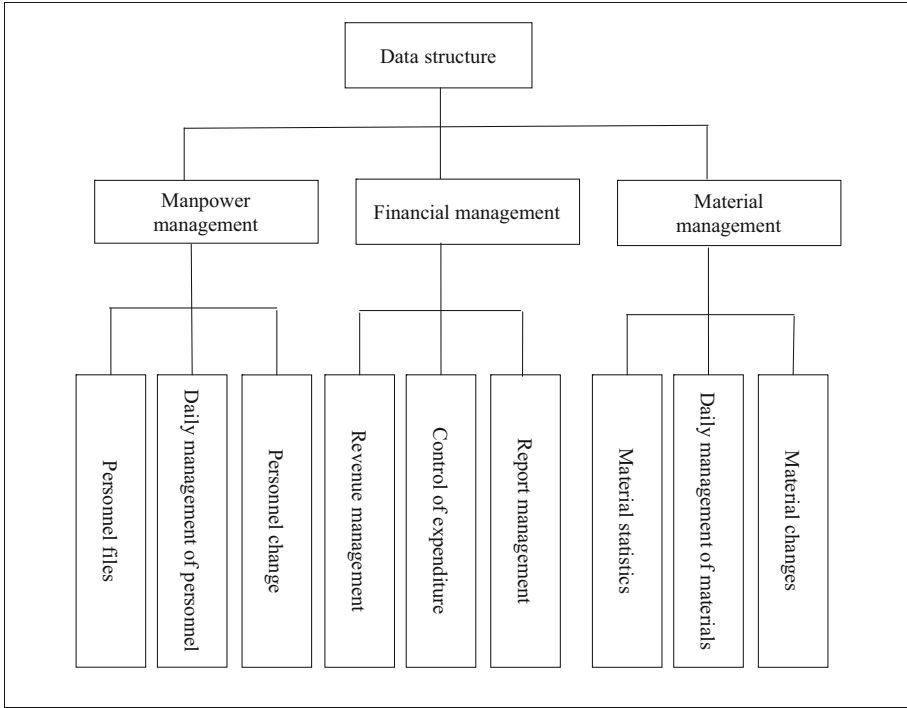
collects personal data, and generates a health trend map. At the same time, abnormal conditions are transmitted to the staff through SMS notification and other feedback reminders. Personalize the health data for the elderly, and their children can develop differentiated monitoring plans for their parents according to their actual situation. The active care structure provides life care for the elderly, birthday reminders, and full care services such as booking birthday wishes, medication reminders, health care, and activity notice. Through audio text messages, it is convenient for the elderly to listen to the weather forecast, health care knowledge, government policies, etc., to better reflect the care and care of the government, society and children for the elderly.

The Data early warning structure could automatically send the dangerous data to the caregivers or their family members, so that they can immediately get the data, make a judgment, and take corresponding measures. The electronic fence structure can grasp the activity Data of the elderly at any time, avoid various safety risks, improve the work efficiency of the management personnel, and ensure the safety of the elderly in the pension institutions. The combination of internal positioning and LBS (location-based service, Location Based Service) location can intermittently send Data to the regional readers and immediate situation to the computer structure management centre, once the Data of the elderly is not uploaded to the computer management structure centre, an alert will be issued, caregivers can view the activity track of the elderly in the previous stage, timely deal with emergencies, so that the elderly can be cared by the care of caregivers all the time. The personnel positioning structure is a management software developed for the real-time positioning, the historical track playback, the Data query and other aspects of the personnel. According to the different requirements, it realizes the functions of the map monitoring, the personnel distribution view, the real-time personnel positioning, the departure alarm, the historical track playback and the Data query.

When the structure detects that the elderly fall, the fall alarm structure will send an alarm message to the monitoring centre in time. The service personnel of the monitoring centre can query the location of the elderly in time, ask the physical condition and surrounding conditions of the elderly through voice, and timely notify 120 ambulances or caregivers in relevant areas to rescue the elderly. When the elderly feel unwell or have an emergency need, they can connect the hands-free phone by manually touching the button in the middle of the product, and talk with the care staff, so as to get timely help. In addition to the local monitoring terminal, the remote viewing structure also provides a kinship portal structure for the relatives of the elderly based on the Internet and intelligent terminal equipment. All access terminals support Data query statistics, real-time tracking of electronic maps, video monitoring, and health data for the elderly.

From the perspective of the operation process of organizational business, the functional composition of the Data structure can be divided into three aspects of the management of people, finance and material, and the specific process included is shown in Fig. 2. The Data structure centrally integrates the data of people, finance and material, and continuously tracks the changes of the data, and clearly and directly feedback the changes to the managers in time, which helps the managers to improve the management efficiency and grasp the progress of the daily business at any time.

Since a large amount of Data is in the same structure, data exchange will be generated between different departments, enabling the full sharing of various kinds of Data



**Fig. 2.** Functional structure of the Data structure for the business operational Angle.

within the organization. Full Data sharing can not only enable the organization to fully communicate between various departments and cooperate to improve the quality and efficiency of services, but also enable managers to understand the development of the organization from an overall perspective, make decisions conducive to the whole, and avoid consideration only from the local perspective of decision-making.

As shown in Table 1, pension service institutions can divide the corresponding types of care service structure according to their own indicators. Among them, the structure scale can be measured from hardware and software. Hardware refers to the number of equipment needed to use in the process of using the structure, and software refers to the type of functions provided by the structure. Because most care service Data structures change according to the number of modules, pension service institutions need to fully consider their own needs for different types of structures, and do not blindly pursue the number of functional modules to prevent the waste of resources. In terms of hardware selection, we should also choose the appropriate equipment according to our own use needs, do not blindly pursue high levels, avoid the waste of resources and a series of use problems caused by the mismatch of software and hardware.

**Table 1.** Types of care service Data structure for elderly care service institutions.

Number of beds	Service personnel	Service types	Structure scale
<200	<50	Basic services: daily care, catering service, health management, safety management and other services involving the daily life of the elderly	Hardware: <10 computers, suitable for the monitoring equipment of the building area. Software: the structure module meeting the basic service
200–500	50–100	Basic services: daily care, catering service, health management, safety management and other services involving the daily life of the elderly Expand services: mental care, public elderly care activities, legal aid and other services to enrich the elderly life	Hardware: 1 server, 10–20 computers, suitable for the monitoring equipment of the building area. Software: structure modules that meet the basic services and extended services
>500	>100	Basic services: daily care, catering service, health management, safety management and other services involving the daily life of the elderly Expand services: mental care, public elderly care activities, legal aid and other services to enrich the elderly life	Hardware: >2 servers, >20 computers, suitable for the monitoring equipment of the building area Software: structure module meeting basic and extended services, backup and security module of structure

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