INNOVATION THROUGH ICT IN CARE HOMES

IN-ICT-CARE

Erasmus Plus Key Action 2. Strategic Partnership in Adult Education,

2019-1-TR01-KA204074733

INTELLECTUAL OUTPUT 2.

METHODOLOGICAL FRAMEWORK OF ICT IMPLEMENTATION

The Coordinator: Karamanoglu Mehmetbey University, Türkiye

The Project Partners:

1) Nexid SRL, Italy

2) Synyo GmbH, Austria

3) Special Education Academy, Türkiye

4) Istituto Dei Sordi di Torino, Italy

5) Escuela Andaluza De Salud Publica SA, Spain

6) Karaman Aile ve Sosyal Politikalar İl Müdürlüğü, Türkiye

Project Start Date (dd-mm-yyyy) 01-09-2019
Project Total Duration : 28 Months
Project End Date (dd-mm-yyyy)   31-12-2021

Legal warning

The European Commission support for the production of this publication does not constitute endorsement of the contents which reflects the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Contact Information

Karamanoglu Mehmetbey University,
Yunus Emre Campus, 70100 Karaman
www.kmu.edu.tr   Phone:+903382262081
Email: iletisim@kmu.edu.tr   and mustafabahar968@gmail.com

The Writers/Contributors

Mustafa Bahar
Hamit Bahçel
İbrahim Ethem Arabacı
Mahmut Özcan
Bilal Çetinkaya
Mehmet Turmuş
Sefa Koçak
İbrahim Kaygısız
Erdal Güzel
Marisol Morena Rasso
Augusto Ruggeri
Mariangela Vanalli
Umberto Migliore
Enrico Dolza
Carolina Carotta
Johannes Braunbruck
Melina Breitegger
Diotima Bertel
Joan Carlos March

INNOVATION THROUGH ICT IN CARE HOMES

Erasmus Plus Key Action 2. Strategic Partnership in Adult Education. KA204

TABLE OF CONTENTS

Introduction

Innovation in information and communication technology (ICT) has a great potential to create large impact on modern healthcare. However, for the new ICT technologies to be adopted, the innovations have to be meaningful and timely, taking into account user needs and addressing societal and ethical concerns. In this study (as an intellectual output) we focus on ICT innovations related to care home- healthcare domain, in which patient safety and security, but also trust and privacy are of utmost importance. To ensure the adoption of new ICT healthcare services, the new innovative technologies need to be complemented with new methods that can help patients to establish trust in healthcare service providers in terms of privacy, reliability, integrity of the data chain and techniques that help service providers to assess the reliability of information and data contributed by patients. This study (as an intellectual output) sketches various lines of practical information and research including trusted healthcare services namely, patient compliance, reliability of information in healthcare, and user-friendly access control.

Technologies primarily serve to acquire accurate indoor positioning, physical activity tracking and physiological status monitoring data of the elderly in real time. Thereinto, a precise indoor positioning sensor network with wireless/wired technologies must be developed to track people's positions in real time. In addition, a software system that includes modules for data processing, feature extraction, physical activity recognition, and intelligent decision making must be developed to support HAR. Moreover, the biomechanical sensors that can monitor the physiological parameters are increasingly promising for integration into a prototype for elderly care. This prototype for elderly care, configured with multiple sensors, will be incorporated into clothing worn by the elderly. Hence, in this review, we summarize the existing knowledge and state-of-the-art technologies that can be used in the design of the wearable elderly care systems.

2. Indoor Positioning Systems: Current positioning technologies can be divided into two main

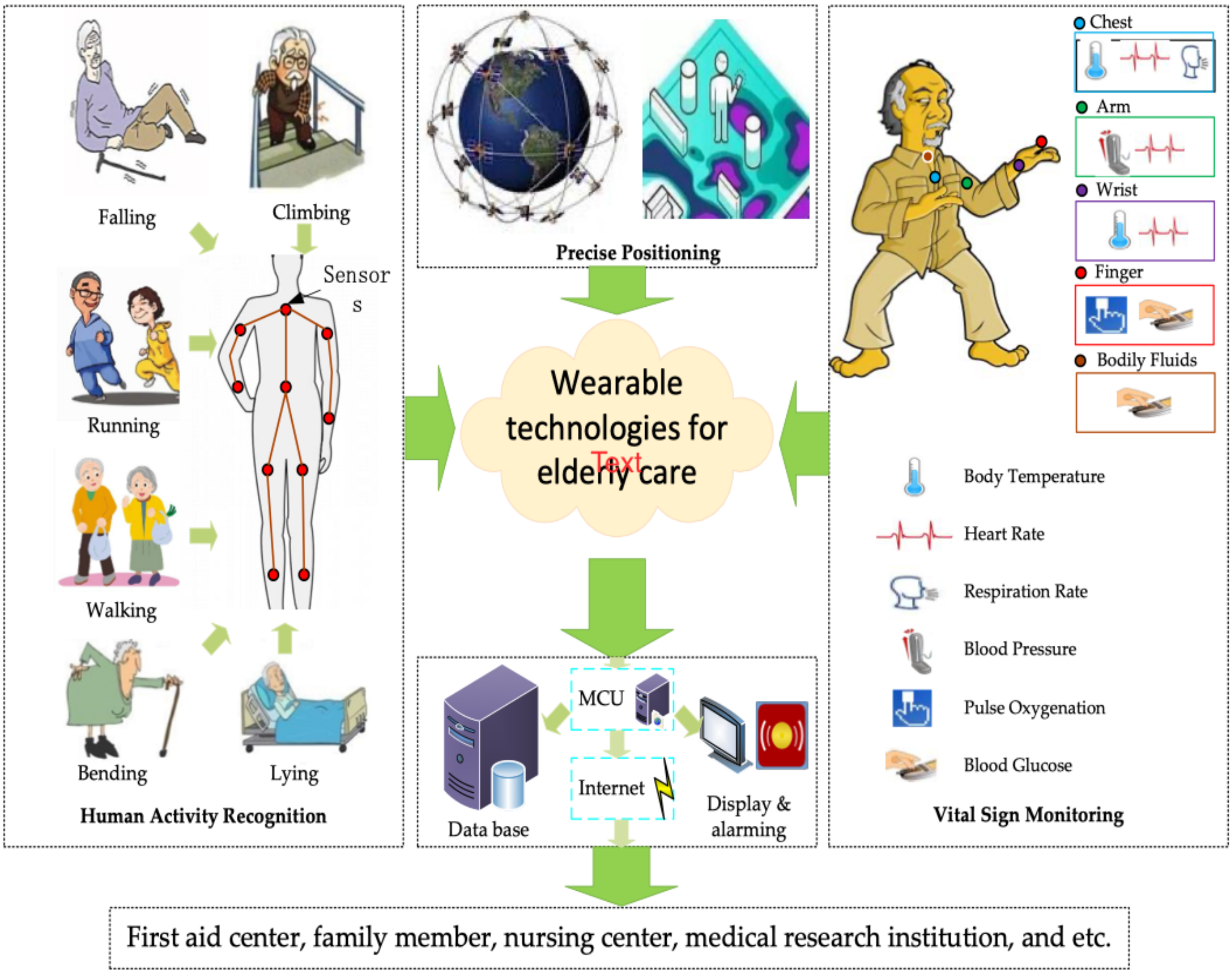

Figure 1. Schematic of functions for elderly care, including precise indoor positioning, physical activity tracking and real-time monitoring of vital signs.

categories: outdoor and indoor positioning systems. In outdoor scenarios (14), several well established and widely used navigation systems can provide location services with near meter-level accuracy. These systems include GPS, GLONASS and BDS. However, indoor scenarios constitute 80% of human lives. Indoors, the accuracy of satellite-based positioning decline sharply because of satellite signal losses due to obstructions from buildings, the multipath effect and inconsistent time delay problems. Therefore, these positioning technologies cannot meet the requirements for an indoor location service (152). Traditionally, indoor positioning systems (IPS) can been considered as systems that function continuously and in real-time to provide the locations of humans or objects in indoor areas (159). IPSs can be used for many scenarios, e.g., detecting and tracking items, providing assistance for elderly and disabled people in their daily activities, and facilitating medical monitoring for vital signs and emergencies. Some public places such as parks and museums also need indoor positioning services, for example, to provide indoor navigation for blind or visually impaired people, assisting tourists to find their locations to eliminate worries about getting lost, and providing introductory information (or even advertisements) to customers or tourists. Moreover, medical care in hospitals also demands IPSs for tracking patients and expensive equipment, preventing theft, and precise positioning for robotic assistants during surgeries (144,251).

2.1. Categorization of IPSs In recent years, indoor positioning technologies have flourished (488) including both hardware platforms and localization algorithms (352,243). A variety of sensing technologies have been proposed, such as RFID, WiFi, acoustic signals Bluetooth, and so on (29,104,195 and 279). These IPSs can be categorized in several different ways according to different criteria. For example, based on system architecture, IPSs can be divided into three classes (88) (1) self-positioning architectures, where objects determine their locations by themselves; (25) infrastructure positioning architectures, in which the positions of items utilizing the infrastructure are estimated to determine whether items are within the coverage area and to track them; and (36) self-oriented infrastructure-assisted architecture, which depends on a system that computes a position and sends it to a tracked target in response to its request. Alternatively, IPSs can also be categorized according to what they use to determining position. IPSs mainly employ: (11) infrared (IR) technologies; (23) ultra-sound technologies; (35) radio frequency (RF) technologies; (14) magnetic technologies; (315) vision-based technologies; and (416) audible sound technologies [22–224]. Other categorizations are possible as well (e.g., based on whether a system requires installation, on sensor types, or on prior knowledge [228–325]).

Among the existing IPS categorizations, this intellectual output emphasizes the categorization as divided existing IPSs into thirty categories based on sensor type, namely, cameras, infrared, tactile and combined polar systems, sound, WiFi/WLAN, RFID, UWB, Assistant GNSS (A-GNSS), pseudolites, other radio frequencies (e.g., ZigBee, Bluetooth, digital television, cellular network, radar, and FM radio), inertial navigation, magnetic systems, and infrastructure systems, as illustrated in Figure 2.Please refer to [33] for further detail concerning each technology

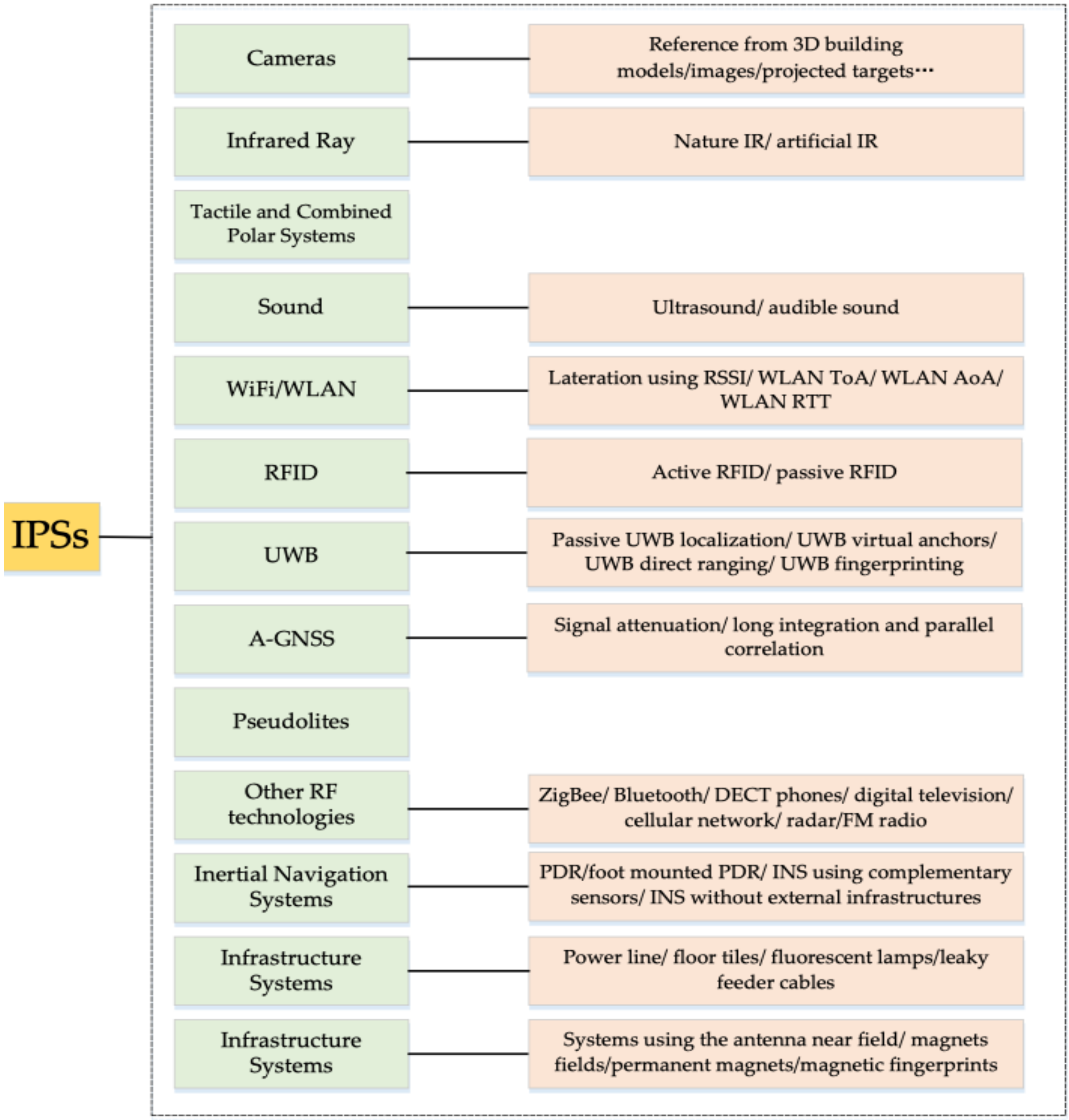

Figure 2. Indoor positioning technologies categorized by Mautz [33].

2.Selection of the Proposed IPSs

To select a suitable IPS for elderly care among the existing IPSs, it is essential to develop performance metrics to evaluate the available systems. Typically, accuracy (i.e., position error) is an important performance criterion for IPSs. However, other performance indexes, e.g., cost, availability, privacy and so on, also need to be taken into considerations. Considering that different applications require different types of IPSs—For example, some areas such as supermarkets and private homes pay attention to cost, while others such as medical tracking and indoor navigation systems for vision-impaired people emphasize high accuracy [9]. The following list summarizes some significant performance metrics useful for comparing the various IPSs (214,227 and 249):

1. Accuracy: the average Euclidean distance between an estimated position and the true position (137).

2. User Privacy: strict access control to the personal information of individuals (257,43).

3. Coverage Area: the area covered by the IPS; this generally includes three levels (i.e., local, scalable, and global [335]).

4. Required User-Side Device: whether extra equipment must be carried to construct the IPS.

5. Cost: the cost of IPS—this metric mainly includes infrastructure costs (e.g., reuse existing infrastructure or install new devices), installing and maintenance cost (e.g., smartphone, smartwatch, can be reused to decrease infrastructure cost), energy consumption, space occupied, etc. (112,341).

6. Complexity: the complexity of designing, constructing, and maintaining an IPS.

7. Continuity: the property of continuous operation of an IPS over a contiguous time period to perform its specific function, including acceptable outage frequencies.

8. Update Rate: the frequency with which target item positions are calculated (either on devices or at external processing locations).

9. Data Output: this metric involves output data types, data output speed, data capture capabilities, data storage, etc.

2.1.2. A-GPS

Assisted GPS (abbreviated as A-GPS or aGPS) can be used to assist positioning where GPS and GLONASS are inadequate because of multipath problems or signal blockage indoors (291,373). A-GPS can achieve indoor positioning by significantly improving its startup performance—i.e., its time-to-first-fix (TTFF) from a GPS satellite-based positioning system [35]. A-GPS can address the positioning problem resulting from poor satellite signal conditions. However, some standalone GPS navigators used in poor conditions cannot fix their positions because of satellite signal fracture; consequently, they are dependent on better satellite reception levels. Generally, A-GPS systems belong to one of two types: Mobile Station Based (MSB) and Mobile Station Assisted (MSA). Many mobile phones possess this function and often combine with other location services such as WiFi positioning systems or BLE beacon positioning systems.

2.1.3. GSM

Global System for Mobile communication (GSM) or cellular-based positioning systems rely entirely on mobile cellular networks—specifically, on second-generation (or higher) versions of the GSM wireless telephone technology. In most countries, GSM networks are ubiquitous, far outreaching the coverage of WiFi networks. Hence, these wide distributed networks can be used to obtain location estimations for cellphone users. Despite their low accuracy, these positioning technologies attract mass market applications such as pay services and emergency assistance. One of the superior advantages of this technique is that they have little interference because the bands they used are licensed; each licensee avoids interference from other devices operating at same frequency. Besides, GSM also has the merit of 24/7 availability. In the real-world digital human behavior quantification (involves both time and location), systems rely on GSM more frequent than GPS, since GPS, are not reliable (especially indoors) at all time [336].

2.1.4. RFID

RFID technology utilizes radio signals to achieve automatic tracking of people and objects by identifying attached tags containing electronically stored information. An RFID system includes two vital parts: readers and tags. In general, tags are categorized into passive tags and active tags. Passive tags collect energy from a nearby RFID reader's interrogating radio waves, while active tags have a local power source such as a battery and may be read at distances of hundreds of meters from the RFID reader. In addition, unlike a barcode, the tags do not need to be within the line of sight of the reader; therefore, an RFID tag may be embedded in the tracked object. Readers are preassigned to specially designated places. They communicate using predefined radio frequencies and protocols. Traditionally, RFID technology has been used to detect proximity rather than to determine position (393).

2.1.5 WiFi

WiFi positioning is currently perhaps the most common and widespread location technology. It uses measurements of the intensity of a received WiFi signal (received signal strength indication or RSSI) to achieve a positioning accuracy of between 3 to 30 m [133]. WiFi can reuse the popularity and low cost of existing WiFi networks to construct localization system. In general, existing WiFi positioning techniques can be summarized into four categories as follows: RSSI based, fingerprinting based, Angle of Arrival (AoA) based, and Time of Flight (ToF) based. However, in the majority of instances, WiFi positioning technology is used for proximity detection in public places such as museums, parks, shopping malls, and so on rather than to determine exact positions. Moreover, continuous WiFi scanning for indoor localization will consume a substantial amount of battery power, which makes this technology impractical for long-term use.

2.1.6 UWB

UWB is a radio technology that can use very low energy signals for short-range, high-bandwidth communications over a large portion of the radio spectrum. UWB can be used for precision location and tracking applications by detecting the time difference of arrival (TDOA) of RF signals to calculate the distance between a reference point and the target (38). Many applications already use UWB positioning techniques, such as real-time indoor precision tracking for mobile inventory, locator beacons for emergency services and indoor navigation for blind or visually impaired people. Hence, UWB is one of the most accurate and promising technologies to realize accurate indoor positioning despite its high costs.

2.1.7 DR

DR uses a previously determined position and tracks changes to infer the current position. It follows the current position based on both past known and estimated velocities over time and heading direction (424). DR systems are most often constructed using Inertial Measurement Unit (IMU) devices that contain accelerometers used for step detection and step length estimation and magnetic compasses or low-cost gyros for heading determination (493). If an initial location is known, based on continuous updates of the travelled distance and heading, the current position can be propagated without the need to acquire an external reference position. Although DR can provide reliable and always-available position information, it suffers from significant errors due to imprecise speed and direction estimates.

2.1.8 Infrared

Infrared positioning technology utilizes both natural and artificial light whose spectrum differs from visible light and terahertz radiation. Consequently, this technology is unobtrusive for humans compared with indoor positioning technologies based on visible light (381). Typical infrared positioning systems can be divided into two types: direct infrared systems and diffuse infrared systems. A directinfrared system uses a point-to-point ad-hoc data transmission standard to achieve very low-power communications, while diffuse infrared systems use wide angle LEDs to emit signals in many directions. There are three IPS approaches that use infrared technology: Proximity, differential phase-shift, and angle of arrival (AoA).

2.1.9 BLE Beacon

Bluetooth Low Energy (BLE) technology achieves peer-to-peer communications while consuming only small amounts of power. Based on BLE beacons, an energy-efficient system can be constructed for indoor positioning. Similar to WiFi, Bluetooth modules are already included in most commercial mobile devices; therefore, no extra device is required on the user side. Because Bluetooth beacons broadcast their unique identifiers to nearby portable mobile devices and can trigger a location-based action on these devices, no paired connection with the mobile device is needed [46]. Thus, BLE beacon based IPS is a competitive technology because it can achieve an acceptable localization accuracy and consumes less energy than GPS and WiFi approaches.

2.1.10. Acoustic Signal

Acoustic signal systems use echolocation to form a location estimate. A pulse outside the human audible range is emitted by a speaker tag attached to the user and received by a series of microphones installed in ceilings (44). The distance of the speaker tag from the microphone can then be estimated by measuring the speed of the traveling sound waves, while multiple receivers allow angles to be determined. Acoustic signal systems are effective for room level accuracy, but suffer from sound reflections, which limits their absolute accuracy. Moreover, large numbers of receivers are required to achieve centimeter-level accuracy for a given coverage area, thus increasing the system’s cost.

2.1.11 Visible Light

Visible Light Positioning (VLP) is an emerging positioning technique based on Visible Light Communication (VLC), which uses light emitted by diodes (LEDs) to transmit digital information [28]. The information delivered by these light signals can be used to determine the position of a person or object within a room. Buildings already have a large number of light fixtures that cover the entire structure, so these fixtures potentially represent a large number of transmitter locations, allowing a much higher transmitter density than other technologies. Because light does not travel through opaque boundaries such as walls or floors, the signal is localized to the room in which it is transmitted. This also eliminates interference between transmitters in adjacent rooms, allowing high spatial reuse of bandwidth. Moreover, light based positioning raises fewer privacy concerns because covering the receiver can guarantee the system is not in use.

2.1.12. Image-Based IPS

This approach uses optical information to realize indoor positioning; therefore, it is also known as optical indoor positioning [235]. In this system, a camera such as a mobile phone camera, an omnidirectional camera or a three-dimensional camera is used as the only or main sensor. The acquired images are combined with computer vision technologies to achieve indoor positioning. In general, this technology is easily affected by environmental factors and requires significant amounts of image processing computation. In addition, providing coverage over multiple rooms requires a prohibitively expensive number of cameras, and positioning performance suffers unless known reference markers are attached to the objects being tracked.

2.1.13. Geomagnetism-Based IPS

Modern buildings with reinforced concrete and steel structures have unique, spatially varying ambient magnetic fields that can be used for positioning, in much the same way (albeit on a muchsmaller spatial scale) as animals use the Earth's magnetic field [418]. In principle, a non-uniform ambient magnetic field produces different magnetic observations depending on the path taken through it. Therefore, indoor positioning can be achieved by using the anomalies (fluctuations) in these ambient magnetic fields. This approach has been facilitated by modern smartphones and the rapid development of sensor technology. Generally, geomagnetism-based indoor positioning needs only a three-axis magnetometer such as a smartphone’s compass to precisely locate individuals within indoor spaces. These systems can achieve positioning errors below 6 feet because each building or structure has a unique magnetic “fingerprint”.

3. Methodologies for Human Activity Recognition

HAR during daily life is another fundamental function for elderly care system because HAR can provide assistance services. Continuous monitoring of elderly activities allows the detection of abnormal situations and can help ameliorate the effects of unpredictable events such as sudden falls. These capabilities are required for this type of wearable system to assist the elderly in their daily lives and increase their safety. As illustrated in Figure 3, the current wearable technologies that can be used to implement HAR can be summarized into three categories: (1) Vision-based recognition use cameras to record video sequences and recognize activities by combining the images with computer vision algorithms. In camera types used include RGB video, depth video and RGB-D video (249 and 73).;

(2) Radio-based recognition systems use technologies, such as ZigBee, WiFi, RFID, etc., to infer human activities from the status of utilized objects or from changes in environmental variables (254);

(3) Sensor-based recognition systems employ on-body (wearable) sensors such as accelerometers and gyroscopes to detect the movements of body parts (413).

The vision-based systems are easily influenced by lighting variability and other exogenous factors; consequently, their recognition accuracy decreases from laboratory environments to outdoor environments due to inevitable visual disturbances (248). In addition, regardless of how many 2D/3D cameras are employed and installed (e.g., a defined number and type of cameras in specified areas) continuous monitoring is still restricted to the camera locations. Because of these limitations, vision-based HAR systems are not well suited to most elderly care applications. In term of radio-based HAR system, the base stations must be prearranged and the tags are often attached to a person's wrist, ankle, head, or other parts. By observing that different human activities cause different wireless communication patterns between the attached tags and the base station, human activities can be recognized. However, these technologies also suffer from a similar drawback as the vision-based technologies: radio-based HAR does not work in areas where a base station is unavailable [355]. Consequently, radio-based HAR systems are also not a suitable scheme for most elderly care situations.

3.1. Sensor Placement The sensor placement of wearable devices refers to the locations where the sensors are placed The sensor placement of wearable devices refers to the locations where the sensors are placed and and how the sensors are attached to those locations. For elderly healthcare, we need to not only how the sensors are attached to those locations. For elderly healthcare, we need to not only monitor monitor normal activities such as standing, sitting, walking, biking, jogging, lying, and climbing normal activities such as standing, sitting, walking, biking, jogging, lying, and climbing upstairs upstairs and downstairs but also recognize abnormal activities such as forward falls, backward falls, and downstairs but also recognize abnormal activities such as forward falls, backward falls, chest chest pains, fainting, vomiting, and headache (165,66). Emphasizing sensor placing and sensor type pains, fainting, vomiting, and headache (365,66). Emphasizing sensor placing and sensor type selection selection is important because wearable sensor placement has a direct effect on the recognition is important because wearable sensor placement has a direct effect on the recognition accuracy of accuracy of body motions (67) and because different sensors (e.g., gyroscopes or accelerometers) are body motions [167] and because different sensors (e.g., gyroscopes or accelerometers) are respective respective important in different situations. For example, if the wearable sensors are placed around important in different situations. For example, if the wearable sensors are placed around the waist, the the waist, the gyroscope data is better for recognizing stair climbing and descending activities in most gyroscope data is better for recognizing stair climbing and descending activities in most situations, situations, whereas standing and sitting activities are better recognized by the accelerometer. For whereas standing and sitting activities are better recognized by the accelerometer. For walking, biking walking, biking and jogging activities, the accelerometer data is slightly better than the gyroscope and jogging activities, the accelerometer data is slightly better than the gyroscope data [261].

How significantly to place reflect sensors gait-related on human features body is during also a locomotion research- worthy problem. The majority of or walking. Steps, travel distance, researchers velocity, and chose energy indirect expenditure forms of attachments can be estimated such by as straps, a foot-worn belts, accelerometer (68,268,310,574) Sensors wristbands, or other accessories to prevent relative motion between the sensors and the parts of the human body (113–263,331–473). Moreover, can also be located around the thigh, the majority of cellphone based HAR studies investigated sensors putting and the embedded wearable devices can also be directly placed into pockets or attached to other parts sensors into pockets; their results showed that thigh-located sensors obtained of high clothing; recognition this was performance especially for prevalent the leg-involved in the smartphone-based activities which many HAR studies. people perform regularly However, these pocket-placed in their daily routines, sensors must i.e., walking, jogging, riding, running, ascending, descending, etc. [59,199,268,277] be guarded against movement, otherwise vibration and displacement can affect the wearable systems and decrease recognition accuracy.

Table 3. Summary of research on sensor placement for HAR.

Sensor	Location	Activities	Reference
Gyroscope Accelerometer	Wrist, hip, neck, knee cap	Wing Tsun movements	Heinz et al. [13]
Accelerometer	Ankle, thigh, hip, wrist, chest	Typing, talking, riding, walking, arm movement, etc. (20 activities)	Bao et al. [74]
Accelerometer	Thigh, Necklace, Wrists.	Falling backward, falling forward, chest pain, headache, vomiting, and fainting and a normal activity walking	Pirttikangas et al. [59]
Accelerometer	Waist.	Walking, running, scrubbing, standing, working at a PC, vacuuming, brushing teeth, sitting.	Yang et al. [71]
Accelerometer, Gyroscope	Lower arm, Hip, Thigh, Wrist	Walking downstairs, walking upstairs, walking, jogging, biking, sitting and standing.	Shoaib et al. [66]
Accelerometer	Thigh	Walking, jogging, ascending stairs, descending stairs, sitting, standing.	Kwapisz et al. [75]
Accelerometer	Lower Back.	Lying, sitting, standing, working. on a computer, walking, running, cycling.	Bonomi et al. [72]
Accelerometer	Hip, wrist, arm, ankle, thigh	Lying, sitting, standing, walking, stair climbing, running, cycling.	Mannini et al. [58]
Accelerometer; gyroscope	Upper arm, thigh	Slow walking, normal walking, brisk walking, jogging, sitting, ascending and descending stairs normally or briskly	Wu et al. [60]
Accelerometer	Chest, thigh, ankle.	Stairs ascent and descent, walking, sitting, standing up, sitting on the ground	Chamroukhi et al. [69]
Accelerometer	Chest, thigh, ankle.	16 daily living activities.	Moncada-Torres, et al. [68]
Accelerometer gyroscope	Thigh	Walking, walking upstairs, walking downstairs, sitting, standing, and lying down	Ronao et al. [76]
Accelerometer; Gyroscope; Barometric pressure sensors.	Wrist; ankle; chest	Walking, running, stair descending and ascending, standing, sitting, lying down, brushing teeth, drinking, cutting food, writing, peeling carrot, eating butter bread, etc.	Moncada-Torres, et al. [68]

3.2 Vital Sign Monitoring

As people grow older, most elderly people suffer from some age-related problems such as hypertension, diabetes, coronary disease, hyperlipoidemia, and so forth. Therefore, it becomes essential to design a continuous and real-time health monitoring and evaluation system to ensure the elderly can have healthy daily lives. Fortunately, due to advances in sensor technology, low-power microelectronics and wireless communication standards gerontechnologies are becoming increasingly commonplace in our society. In particular, advances in wearable and non-invasive sensors make it possible to regularly, comfortably and continuously monitor human vital signs for improved in-home healthcare. Regular vital sign monitoring is crucial in constructing the health baseline for an individual and alerting users and medical professionals of risky situations when further medical attention and care may be necessary.

Here, we limit the discussion to wearable and non-invasive biosensors, omitting implantable devices. Such sensors can be worn in contact with or near to the body and can measure an impressive variety of vital signs. Four main vital signs are routinely monitored by medical professionals: body temperature, heart rate, respiration rate, and blood pressure [103]. Therefore, we first summarize the techniques to detect and monitor these bio-signals. In addition, other bio-signals such as pulse oxygenation (oxygenation of fresh arterial blood) and blood glucose are also widely used by medical professionals, although they do not yet fall into the category of main vital signs. However, we also present some wearable technologies that can monitor these vital signs. Table 6 briefly summarizes some human vital signs that have been successfully monitored using wearable sensors in past studies.

Table 6. Summary of several vital signs and measurement technologies.

Vital Sign	Range & Scale	Technique	Tranduced Signal	References
Body temperature	32–45 °C	Thermistors; thermoelectric effects; optical means	Resistance	Husain et al. [104]; Chen et al. [105]; Richmond et al. [106].
Heart rate	0.5–4 mV (ECG)	Skin electrode; optical; MI sensor.	Voltage/Current	Anliker et al. [107]; Rienzo et al. [108]; Xu et al. [109].
Respiration Rate	2–50 b/min [1]	Strain gauge/Impedance	Resistance	Folke et al. [110]; Guo et al. [111].
Blood pressure	10–400 mm Hg	Piezoelectric capacitors; capacitive strain sensors	Drain current	Schwartzet al. [112]; Dagdeviren et al. [113]
Pulse oxygenation	80%–100% (SpO_2)	Optical means.	Photodiode current	Lochner et al. [114]; Bansal et al. [115]
Blood glucose	0.5–1 mM [2]	Electrochemical	Current	Liao et al. [116]; Vashist [117]

[1] b/min: breaths/min; [2] mM: millimoles per liter.

3.3 Body Temperature

A person’s body temperature (BT) is an important vital sign that can provide an insight into their physiological state. The normal core body temperature of a healthy, resting adult is stabilized at approximately 37 degrees Celsius. This temperature fluctuates due to changes in the metabolism rate. For example, body temperature is relatively lower in the morning because a resting body has a slower metabolic rate, and it is higher at night, after daytime muscular activity and food intake. In general, an abnormal body temperature is an indicator that a person may be suffering from an infection, fever or low blood flow due to circulatory shock. When measuring body temperature, the choice of measurement site is important because body temperature varies when measured at different locations. For instance, normal oral temperature (usually considered as the standard measurement for normal core body temperature), is approximately 37 degrees Celsius, whereas a rectal temperature (which is the most accurate type of body temperature measurement) is typically fall approximately 37.6 degrees Celsius when taken at room temperature [103 and 118].

Body temperature can be monitored by using thermistors, the thermoelectric effect, or by optical means [13]; however, the most commonly used technique for non-invasive and wearable temperature measurement is the thermistor. Using a negative temperature coefficient (NTC) resistor as a temperature sensing element, Chen et al. [115] proposed and demonstrated a design for a non-invasive temperature monitoring scheme in which conductive textile wires are used to integrate the sensors into a wearable monitoring platform such as a baby's smart jacket. Similarly, a textile-based temperature sensor was manufactured on an industrial-scale flat-bed knitting machine by incorporating the sensing element into a double layer knitted structure [104]. Nickel and tungsten wires proved to be good candidates for the sensing elements in temperature sensitive fabric due to their highreference resistance, sensitivity and availability. The resulting sensing fabric can be applied to make wearable skin temperature measurements from the wearer. Moreover, many commercially available thermistor and temperature ICs already exist, such as LM35. These can be attached directly to the skin; however, note that skin temperature measurements by wearable sensors may not reflect the body's core temperature, so a calibration algorithm is needed to establish the relationship between the two temperature measurements [206].

3.4 Heart Rate

Heart rate (HR) or pulse is unarguably the most pivotal variable in a human body. The heart must be in perfect working condition for a person to be considered healthy. The human heart is primarily in charge of pumping oxygenated blood and nutrients to all the parts of the body and through the organs that remove carbon dioxide and other wastes. Generally, any major changes in a person’s physical or mental state usually result in pulse changes. The HR of a healthy resting adult ranges from 60–100 beats per minute. However, the HR frequency of any individual varies from this baseline depending on their activity and physiological state. For example, during sleep, a slow heartbeat of approximately 40–50 beats per minute is common and is considered normal. By measuring HR abnormalities, many types of cardiovascular diseases can be diagnosed [319].

Heart rate can be accurately measured by many techniques, ranging from electrical or optical to strain sensors. In term of electrical measurement, electrocardiography (ECG) monitors heart rate using electrodes. Because the ECG signals are periodic, the HR can be inferred from the R-wave-to-R wave (RR) interval of these periodic signals [107 and 335]. For example, Anliker et al. [27]

investigated silver-coated chest suction electrodes (or adhesive silver/silver-chloride electrodes) without gel or paste and gold-plated electrodes as long-term ECG signal monitoring approaches. Xu et al. [409] used a pair of epidermal electrodes in a band aid form factor to monitor ECG signals from the sternum. The highlight of this approach is to use ideas from soft microfluidics, structured adhesive surfaces, and controlled mechanical buckling to achieve ultralow modulus, highly stretchable systems that incorporate assemblies of high-modulus, rigid, state-of-the-art functional elements. In addition, plethysmography is another powerful approach to measuring HR. When the heart beats, oxygenated blood is forced out of the heart while deoxygenated blood is pulled into the heart. This process distends the arteries and arterioles in subcutaneous tissue. Based on this theory, the HR can be detected by measuring the pressure of these subcutaneous tissues. For instance, Schwartz et al. [352] and Nie et al. [320] utilized high pressure sensitive flexible polymer transistors and droplet-based pressure sensors to achieve this pressure measurement. Moreover, sensitive magnetic sensors can also be used for quasi-noncontact pulse rate monitoring, such as amorphous metal wire-based magneto-impedance (MI) sensors, which are sensitive at pico-Tesla (pT) levels. These sensors have been shown to be able to measure a magnetocardiogram (MCG) in non-shielded conditions [11,122].

3.5 Respiration Rate

The human respiration (breathing) rate (RR) is another primary external physiological parameter that can indicate health status. Abnormal breathing rates suggest inefficient oxygen inhalation and carbon dioxide expulsion from the body's tissues and are indicative of many diseases such as sleep apnea, asthma, chronic obstructive pulmonary disease, and anemia. Besides, RR monitoring is also one of important means for sleep monitoring [13]. To some extent, monitoring of sleep quality can be used to estimate the quality of health and even diagnosis of some disorders, such as sleep apnea, sudden death syndrome and heart diseases [124]. Typically, a healthy resting adult human RR is approximately one breath every 6.4 s, and the amount of air inhaled and exhaled is approximately 500 mL. A person's RR tends to be constant across all ages. However, elderly people sometimes find it difficult to breathe normally. Internal lung structures and the respiratory system can change with old age, leading to breathing difficulties in elderly people. The rate of expansion and contraction of the lungs decreases, leading to more difficulty in breathing.There are various approaches for long-term RR monitoring, but generally these can be categorized as either directly detecting airflow during the breathing process or indirectly responding to chest and abdomen expansion and contraction during breathing. For directly monitoring the breath flow, sensors can be located near the nose or mouth that responds to changes in air temperature, pressure, humidity, or carbon dioxide concentration as respiration occurs [210]. However, these sensors are not suitable for a smart clothing platform because they require inconvenient placement; consequently, this article does not discuss this approach further. The indirect method measures physical parameters such as detecting the changes in lung volume related to respiration. To date, various approaches have achieved measurements of electrical signal transduction and lung movement during inhalation and exhalation. With the rapid advance in textile-based technologies, a number of RR sensors have been built directly into textiles and are able to detect breathing rates accurately without reducing user comfort. For example, by integrating coated piezoresistive sensors in garments, Guo et al. [111] designed a wearable sensing system for long-term RR monitoring. Their system can distinguish the predominant breathing compartment (chest versus abdominal breathing) and is also capable of detecting a 10 s pause in breathing, which can be import in sleep apnea research. Another example was demonstrated referring to [25], where Atalay et al. developed a respiration belt using weft-knitted strain sensors to monitor RR. In this system, sliver-coated polymeric yarn was knitted together with elastomeric yarn to develop an interlocked knitted fabric with conductive loops in a single jersey arrangement. The sensing element is located within the fabric to avoid any contact between the human body and the sensing elements that could adversely affect the signal yield. For more information, please refer to [104].

3.6 Blood Pressure

Blood pressure (BP) measures the force of blood inside an artery. The two most significant numbers in blood pressure are the maxima (systolic) and minima (diastolic). Generally, the BP of a healthy person is regarded to be 120/80 millimeters of mercury (mm·Hg) where, the systole is 120 mm·Hg, and the diastole is 80 mm·Hg. Anything above 140/90 mm·Hg or below 120/80 mm·Hg is a matter for concern and should be checked. An increase (hypertension) or decrease (hypotension) of BP in the body indicate a malfunction. Both have many causes that can range from mild to severe and either may have a sudden onset or appear over long durations. Long term hypertension is a risk factor for many diseases, including heart disease, stroke and kidney failure. The reasons for changes in BP are still under investigation, but some causes include stress and being overweight. Increases in BP lead to other problems—especially heart problems. Changes in BP are typically not detrimental until approximately age 45 for both men and women; after which the adverse effects gradually tend to become more prominent.

Conventionally, BP is detected by using sphygmomanometers. However, these devices are not suitable for continuous healthcare systems because of their stationary setup requirements, cost, and lack of monitoring capability. The state-of-the-art sensor-based BP monitoring systems typically employ capacitive sensitive strain sensors [19], including both compressible and piezoelectric capacitive strain sensors. Compressible capacitive strain sensors are composed of an elastic, while piezoelectric capacitative strain sensors are composed of a robust dielectric sandwiched between two flexible electrodes. When the dielectric is squeezed by externally applied pressure, it will lead to the capacitance changes of the device. Similarly, if the piezoelectric material is strained, an induced voltage will be generated in the device. For example, Dagdeviren et al. [113] developed a conformable amplified lead zirconate titanate sensor with an enhanced piezoelectric response for cutaneous BP monitoring with a sensitivity and response time reaching approximately 0.005 Pa and 0.1 ms, respectively. This level of performance ensures that the sensor can be used to measure BP. In their BP measurement experiments, they attached this sensor to a subject's wrist, arm or neck for long-term blood pressure monitoring. Their results suggest that these materials and the resulting sensor capabilities are feasible for BP

monitoring. Additionally, RFID techniques have been shown to detect BP but they require device implantation under the skin [106].

3.7 Pulse Oxygenation

Oxygen saturation or oxygenation can be defined as the fraction of oxygen-saturated hemoglobin relative to total hemoglobin (unsaturated + saturated) in the blood. The human body needs to maintain a relatively precise and specific balance of blood oxygen. A 95%–100% blood oxygen level in human beings is considered normal. When this level falls below 90 percent, it is considered low, causing hypoxemia—particularly, tissue hypoxia—which is a major cause of morbidity and is ultimately the cause of death in most humans. According to the measurement location and method, oxygenation can be divided into three categories—tissue oxygenation (StO_2), venous oxygenation (SvO_2), and peripheral oxygenation (SpO_2). Among all the different oxygenation measurement techniques, SpO_2 measurement is ubiquitous because it is non-invasive.

Pulse oxygenation monitoring is typically achieved by monitoring SpO_2 in a noninvasive way in fresh pulsatile arterial blood. The most frequently used measurement device is a pulse oximeter, which is an optics-based approach in which a pair of LEDs alternately shine light through a translucent part of the user's body (usually a fingertip, earlobe, or area on the forehead or wrist). One LED is red, with a wavelength of 660 nm, and the other is infrared, with a wavelength of 940 nm. During a specific time, the intensity of light transmitted through the translucent part changes because of different levels of light absorption. More specifically, the blood volume and concentration of oxy-hemoglobin in the blood determine the extent of light absorption. A photodiode (PD) located at the opposite side is used to collect the transmitted light. Then, using a lookup table based on Beer-Lambert's law, a pulse oxygenation measurement can be calculated [107]. In the past, the majority of commercially available products used inorganic optoelectronics that restricted sensing locations to finger tips or ear lobes due to their rigid forms and area-scaling complexity. Recently, with the advances in organic optoelectronics, the flexible form factors of organic LEDs (OLEDs) and organic photodetectors (OPDs) have become prime candidates for use in pulse oximetry because of their ability to conform to the human body [114]. An all-organic optoelectronic sensor system for pulse oximeter was presented in [274]. In this system, Lochner et al. [114] used green (wavelength: 532 nm) and red (wavelength: 626 nm) OLEDs coupled with an OPD, which are more compatible with flexible substrates, instead of a red and near-infrared LED pair. Compared with commercially available oximeters, the oxygenation measurement error of the all-organic sensor is below 2%. Additionally, another wearable organic optoelectronic sensor was presented in [115]. This sensor can be mounted on a forearm using a flexible bandage that incorporates the photodiodes and an OLED light source in the middle. The results of experiments successfully showed changes in the tissue concentration of oxy-hemoglobin upon induction and termination of ischemia induced in the arm.

3.8 Blood Glucose

Glucose is commonly considered to be the primary source of energy for human cells. From a physiological aspect, glucose is delivered from the intestines or liver to body cells via the bloodstream and is made available for cell absorption through the hormone insulin, which is produced primarily in the pancreas. Blood glucose measurements reflect the amount of glucose in human blood. Its concentration is usually lowest in the morning and increases after meals. A blood glucose measurement out of its normal range may indicate the need for medical care. Commonly, hyperglycemia is indicated by a continuously high blood glucose level while hypoglycemia is indicated from a low level. Diabetes is caused by persistent hyperglycemia and is the most common diseases related to abnormal blood glucose regulation. The World Health Organization reports that 9% of adults worldwide suffer from diabetes. Therefore, daily blood glucose monitoring is essential both for preventing diabetes and improving the health and quality of life of people who suffer from diabetes

4. Methodologies for Positioning Technologies

Positioning technologies are divided into two categories: outdoor positioning and indoor positioning. The proper and practical method to realize the outdoor positioning is using commercial GPS. So choosing a suitable indoor positioning scheme for elderly care is more problematic. From the above reviewing, some existing technologies, such as UWB, RFID, visible Light, can meet the requirement of healthcare scenarios. However, these technologies need to prearrange necessary devices as base stations. To construct these positioning networks is costly because many base stations is needed to cover complex daily living environment of elderly people. Besides, they cannot position in unreached area such as the elderly go shopping in supermarket. The indoor location schemes using geomagnetism or motion sensors (an integration of a three-axis gyroscope, three-axis magnetometer, and three-axis accelerometer) seem to be suitable for the elderly care scenarios because of low-cost, no extra devices, and can serve to position at unpredicted areas. But, the accuracies of geomagnetic IPS or PDR systems (which range from 0.1 m to 2 m and from 1 m to 5 m, respectively) are not precise enough to meet the demands of AAL in elderly care scenarios. Therefore, a supplementary approach must be adopted to achieve a robust and precise indoor positioning and tracking system. For example, the authors of (38,54,65,77,139–165) combined PDR with other approaches to improve localization accuracy (e.g., GPS, ultrasound ranging, active RFID, WiFi signatures, and Chirp Spread Spectrum (CSS) radio beacons). The accuracy of these approaches can be greatly improved compared withstand-alone PDR systems, with errors reaching below 1.7 m. Hence, in this review, a scheme fusing a PDR system with a magnetic indoor positioning technique is recommended. For one reasons, this fusing can be used to reduce the localization error; for another reason, individual PDR or geomagnetic IPS can work in the low-accuracy scenarios such as semi-outdoor.

4.1 Physical Activity Detection

Human activity detection and monitoring during daily life is another significant function for elderly care. With continuous and timely activity monitoring, elderly people can benefit from effective actions taken when abnormal situations or unpredictable events occur. Sensor-based HAR has benefited from the rapid development of MEMS sensor technologies. Thereinto, accelerometers have been employed in the bulk of sensor-based HAR applications so far. However, these systems have limitations. HAR systems that rely solely on accelerometers do not perform well in some complex activity recognition scenarios because an accelerometer provides only acceleration information. Consequently, sensors such as gyroscopes, magnetometers, and barometric pressure sensors have been combined with accelerometers to improve the performance of complex activity recognition. Sensor placements are determined by the type of activities to be recognized. As classification algorithms, criterions, such as recognition accuracy, power-consumption, and the practicality of the entire systems, should be taken into consideration. Algorithms that consume more power will reduce or restrict the operational duration. Thus, HAR algorithms for “smart clothing” have carefully considered how to remain computationally light-weight. In terms of the type of sensors, the hybrid accelerometer, gyroscope and magnetometers is recommended to construct elderly care systems, because complex activities are also needed to be recognized and tracked during the daily lives of the elderly. With the repaid development of different computational units, such as GPUs, low-power CPU cores, multi-core CPUs, coupled with increasing amounts of memory, it have become possible to use complex models like DL algorithm to improve the performance of HAR systems, both accuracy and activity category. Hence, elderly care systems that employ this much more intelligent algorithm will become the future trends.

4.2 Vital Sign Monitoring

Due to aging, most elderly people are obsessed with various age-related diseases. Therefore, through real-time monitoring of health parameters, some pathemas can be prevented in non-clinical environments instead of being treated in hospitals. Regular monitoring of vital signs allows the construction of an individual's health baseline and can alert both users and medical professionals of risky situations that may require further medical attention. This review chiefly summarized and discussed flexible, noninvasive and wearable vital-signs monitoring sensors, focusing on bio-signals such as temperature, heart rate, respiration rate, blood pressure, pulse oxygenation. These wearable sensors composed of flexible and stretchable materials have the potential to better interface to the human skin. From the data processing and transmission point of view, silicon-based electronics are extremely efficient, which can be used to construct a monitoring and alarming systems. If these flexible and stretchable sensors combine with low-power electronics, these systems can consume less power and work with a long duration to support wide coverage and mobility. In the long run, these biosensors will become tinier, smarter, and more energy conservation. Another important aspect of vital sign monitoring is how the collected bio-data are fused and processed for prediction, diagnosis, decision making and guidance to lead a healthy lifestyle (note that functions, such as eating behavior quantification, exercising properly, eating healthy diet, etc., are the vital future use trends of vital sign monitoring.) The proper method is to constitute wearable Body Area Networks (BANs). In the future, these BANs may be based on nanonetworks, a completely novel communications paradigm that aims at copying natural molecular and cell communications (255).

5. METHODOLOGIES FOR TRUST MANAGEMENT IN CARE HOME SERVICES

Care home healthcare services aim to support people who are rehabilitating. These services gather patient’s sensitive information that is then interpreted by medical professionals to manage their diseases. The adoption of such services, however, hardly relies on the patients’ trust in a healthcare service provider in terms of privacy of the data chain and physicians’ trust in the reliability of information and data contributed by patients. In particular, a number of questions should be addressed:

How can compliance with a treatment be reliably measured?

How can patients use care home healthcare ICT services while ensuring their privacy and controlling the use of information in a simple intuitive way?

Answers to these questions require investigating different research lines including patient compliance, reliability of ICT information in healthcare, and user-friendly access control.

The advance of ICT technologies is leading to the design of novel electronic healthcare services that improve people’s health and well-being but also extend beyond the individual towards sustainability of our society. Consequently, many countries created policies to foster innovation and spread the successful adoption of these technologies in their healthcare sector. In this process of innovation creation it is crucial to focus on meaningful innovations, sustainability and societal and ethical values underpinning the innovations. Meaningful innovation means new ideas, new approaches, new solutions that make lives healthier, more enjoyable, and more productive. It also means that they should be driven by user needs (not by technology), tak-ing into consideration economic, societal and environmental sustainability. They should be well timed and introduced when they really make sense.

ICT healthcare technologies are somehow controversial. On one hand, ICT technologies improve the quality of patients’ lives and provide faster and cheaper healthcare services. On the other hand, they are exposed to different security and safety threats as the patient is far from healthcare providers, and it becomes simpler to collect, store, and search electronic health data, thereby endangering people's privacy.

Electronic healthcare services offer important economic and social benefits for our society. Patients rely on these services for their safety and care and for improving their quality of life. For physicians, electronic health and wellness services offer support for providing more effective and continuous care. For insurers and governments, these services bring a reduction of costs, and for commercial service providers, this is a new business opportunity. However, electronic healthcare services cannot be exploited until the trust question has been addressed in a fundamentally correct way.

Indeed, trust is a pre-requisite for the acceptance of these services by end users. Trust establishment is crucial for physicians and service providers as they will use healthcare services to implement and extent (medical) treatments. In particular, healthcare providers need to trust the patient data they obtain remotely from the measurement devices deployed in patient's home. It is crucial for them to know that a vital sign of a registered user is measured (not of his friends/children), that the measurement was taken with a certified device, under standardized conditions (e.g., with the blood pressure cuff on the arm at the heart level) and that it is not obtained as a result of device malfunctioning.

In a healthcare setting, trust is also of special relevance because healthcare services deal with very personal and private information. Home healthcare services monitor patients and gather data that is interpreted by medical professionals. Health and wellness services support people in need in many ways on the basis of personal and health related information. People in health communities share health and well-being information which then becomes potentially available to the whole community and beyond.

One of the methodologies is that to produce legistation to protect the care home patients' electronic health records. In this respect, sharing patients' health records must be prohibited and there must be strict rules to monitor how the health records are used. For instance, Dutch government has developed legislation to protect sharing such information on December 17 2008, which has been active since then.

Another methodology would be to facilitate the acceptance of electronic healthcare services, it is necessary to develop the technology that help end-users to establish trust in healthcare service providers in terms of privacy, reliability, integrity of the data. Standard Internet security techniques provide authentication and encryption of the communication with a service provider. However, they do not provide the user with means to control or even know how a service provider will actually use their personal information. It is important to have mechanisms in place that allow users to make an informed decision to trust a service provider on the basis of facts, such as reputation and security attributes.

An example of methodology for data privacy

The THeCS project addresses the very important trust questions (transparency, privacy and security) for healthcare services. THeCS is a Dutch national project in the COMMIT program with 11 partners including representatives from industry, Dutch research institutes, Dutch universities and hospitals. The project addresses trust as one of the key issues for new electronic healthcare services. It will create measurable and enforceable trust. This notion is new for electronic healthcare services (and for Internet services in general), and it is fundamental for their success. The objective of THeCS is to create new techniques for measuring and controlling the reliability and use of (healthcare) information. These techniques allow users and service providers to trust each other and to benefit from these new services.

The concrete goal of the THeCS project is to create and define:

Ethical, legal, sociological and psychological requirements for trust in healthcare services. The spectrum of healthcare services is very wide, ranging from formal medical services to pure commercial services that support every day activities. Often these services share information. It is this integration of services from different domains and information sharing that is of particular interest.

A technical protocol to reliably assess the quality of medical data (e.g., blood pressure) measured by patients at home, e.g., identification of the patient, compliance with measurement protocol, certification of the measurement device.

A cryptographic technology that enables health service providers to process encrypted medical information so that only intended operations are possible and thatinformation is not disclosed otherwise. A specific example is categorization of a community into groups of patients with similar (according to a definition relevant for healthcare) characteristics, without disclosing the characteristics of individual patients.

A cryptographic technology for privacy preserving data mining of patient health data to support clinical research and knowledge creation for clinical decision support systems.

6. Methodology for Patient Compliance

In care home healthcare services, patients do not receive treatment (e.g., medication, rehabilitation) directly at the hospital; rather, doctors prescribe treatment to their patients and care home healthcare service providers who should follow such a treatment at care home. This, however, leads to a question on how to assess patient compliance with the prescribed treatment.

Compliance with a medication regimen or a treatment is generally defined as the extent to which patients take medications and follow the treatment as indicated by their healthcare providers [2]. The adherence to a treatment by the patient is crucial both for the treatment evaluation and for the patients' recovery. However, given the large range of existing treatments, patient compliance is difficult to assess.

Several solutions for patient compliance have been proposed in the literature. A number of proposals focus on medication adherence. Here, compliance measurement methods can be classified in direct and indirect methods [21]. Direct methods measure, for instance, concentration of a drug or its metabolite in some biologic factor such as blood. Indirect, methods are based on the assessment of clinical response by a medical professional, patient questionnaire about the adherence, patient diaries, and pill counting. Other types of adherence measurements (83-61) include medication possession ratio and related measures of medication availability, discontinuation/continuation, switching, medication gaps, refill compliance, and retentiveness/turbulence.

An example of indirect method is proposed in (80). This work aims to identify hypertensive patients who do not adhere to prescribed medication using an ontology based approach. In particular, patient information such as patient prescription details, medication possession ratios and blood pressure measurements are specified in an ontology. Adherence of patients to medication is then determined by querying the ontology using non-adherence criteria (e.g., patient who have lapsed medication while having a low medication possession ratio).

Recently, advances in patient monitoring systems have made possible to remotely monitor the patient to keep track of his health status and partially compliance too. Such solutions include, for instance, the application of body sensors (29) smart device integration for patient monitoring (144,155) and event-based methods (411) which aim to capture the patient's activities and vital metrics.

In summary, several efforts have been devoted to the definition of methods for treatment adherence. However, existing solutions only concentrate on a specific type of treatment such as medication adherence or monitoring of patients' activities. This is insufficient in practice as the treatment for certain diseases often consists of different types of treatments. For instance, patients affected by COPD should adhere to a number of different treatments such as smoking cessation, vaccinations, rehabilitation, and drug therapy. The effectiveness of the treatment can be assessed only by assessing and combining the adherence to the single treatments.

Providing a solution for patient compliance to the treatment still remains a challenge. In particular, we need comprehensive solutions for measuring patient compliance for healthcare services. The development of such solutions requires investigating and integrating existing measurement mechanisms for patient compliance. The methodologies should not be limited to existing solutions specific for healthcare, but it should consider compliance checking techniques proposed in other domains like privacy and business process.

7. Methodologies for Reliability of Information in Healthcare

To assess patient health status healthcare providers have to rely on measurements which may have been taken directly by the patients. Thus, trust and reliability of the measurements is a necessary condition for the acceptance of the service by healthcare providers. Next to ensuring proper patient/device authentication, data authenticity and integrity, it is important to capture the correctness of the authentication process too. An overall solution that can capture all these aspects is the application of reputation systems, where providers build a level of trust in the patient based on his ability to take measurement.

8. Methodologies for Reputation systems

Reputation systems have been studied in the literature for different domains, such as auction websites and peer-to-peer sharing networks [69]. Lately, reputation systems have been proposed for healthcare. Most existing approaches, however, focus on the patient perspective, where patients rate the services of doctors and healthcare providers via a web portal or a health oriented network [393]. Conversely, very few studies address patients' trustworthiness from the perspective of healthcare providers and in particular the reliability of measurements taken by patients. Existing proposals [291] mainly focus on the reliability of the data maintained in the form of electronic and personal health records.

9. Methodologies for web portal rating

Additional problems appeared with the growing use of web portals rating healthcare services. Patients often subscribe to expert websites and search information regarding their illness on the Internet. Although this practice may have advantages, the major drawback concerns the trustworthiness of information. For instance, in Revolution Health 3 and other similar online community reputation systems, the trustworthiness of information is assessed only by considering the information source. To assure information trustworthiness we also need to consider the information itself (25 and 58).

10. Methodologies for User friendly advanced access control

Healthcare services deal with very personal and sensitive information. The protection of sensitive information is usually enforced using access control. In particular, the challenge in designing an access control system for carehome is that, while posing strict constraints on the access to sensitive information, the system has to cope with the dynamic environment of healthcare and the potential exceptions that are raised in case of emergency. Furthermore, medical data can also be formed as arbitrary text, such as a patient report made by healthcare practitioners, leading to the need for policies based on content. In this trend, content-based access control and tagbased access control can be proposed. For instance, content-based approaches have been used for the protection of medical images. Although these access control models are very expressive and allow the specification of a wide range of authorization policies, they are usually difficult to use by end-users.

The last years have seen an increasing interest in the development of user friendly privacy management and access control systems. For instance, various enterprises designed platforms which allow users to set their privacy and access control policies. One example is Google dashboard privacy tool, which through a web interface displays to users what information about them is stored and who can access it. Similarly, social networks such as Facebook let users restrict or grant access to other users or groups on their data (e.g., wall posts, photos). Although these proposals provide a simple and straightforward solution, they neither allow users to understand the effect of the specified policies nor ensure secure access control.

Therefore, a need for more flexible yet friendly privacy management exists. Efforts such as privacy dashboard, PrivacyOS project, Primelife project and privacy room [44] provide tools (e.g., browser add-ons, mobile applications) for regulating the exposure of user data to the network. Pearson et al. [65] propose a client privacy management scheme based on data obfuscation (not necessarily using encryption) and user “personas”. Although these proposals increase usability and flexibility, they do not provide users with the overview of the effect of the specified policy.

The challenge is to define a novel access control model which guarantees an appropriate level of security and allows users to specify the policies regulating the exposure of theirinformation to others. In addition, the model should be easy to use by end-users. Ideally, the access control system should not only allow users to define access rules to their data but also support them in “visualizing” the effect of the defined access control policy and therefore in ensuring that the created policy reflects user’s intentions. The lack of such an overview might result in a loss of sensitive information. For instance, a patient might set strict access rules regarding his health condition and his disease and leave unrestricted access to some information which may reveal his medical condition. As an example, a patient affected by HIV might want to prevent the disclosure of information regarding his medical condition. Thus, he restricts the access to the corresponding fields in his EHR that contain information regarding his disease (e.g., HIV status, HIV antibodies). However, the patient might not restrict access to other fields (e.g., white blood cell count, CD4 T-cells count) from which, although they do not contain his HIV status, his disease may be inferred.

The design of a user-friendly access control model demands to conceptually divide the access control model in two layers: a high level layer, in which end-users can easily specify their privacy preferences, and a low-level layer, which consists of machine readable policies eventually enforced by the system. The refinement and mapping of high-level policies (specified by users) into enforceable policies can be achieved, for instance by enabling semantic interoperability between high level description of information to be protected and the data objects in which such information is stored. The aim of this semantic alignment is to support the automatic generation of enforceable policies from the high-level policies specified by users. As a result, enforceable policies can be dynamically customizable with respect to user preferences.

11. Methodology for Caregiver Alert Systematic

How do I choose a caregiver alert system?

When selecting the best caregiver monitor, consider your loved one’s needs and personal budget, as well as the versatility of the device.Ask the following questions to find a good fit:

- Are there monthly data fees or other contractual obligations?

- Does it have fall detection or prevention?
- Does it have home security monitoring for fire, carbon monoxide, and smoke?
- Does it need to be charged daily?
- Will the software or any other components need to be updated regularly?
- Where is it installed or attached, and how does it operate?
- Is the device waterproof?
- Is the information on the device secured?
- Do you trust the company to protect private information?
- What is the connectivity, mobility, and range of the sensor?
- Will family members be able to connect to the device?

Examples of methods for monitoring elderly patients remotely

Explore senior monitoring sensors that track a variety of environmental and physical factors and alert caregivers to potential safety issues quickly.

1. Aeyesafe Monitoring Alert System

Aeyesafe Monitoring Alert System is a sound and thermal monitoring system that provides current and historical data. It doesn't require human intervention for monitoring, which encourages independence. The system allows the user to request help if needed through voice activation, and it uses artificial intelligence sensors, which provide human-like monitoring.

In using heat and sound monitors, the device provides:

- Body temperature analysis
- Sleep analysis
- Danger detection
- Abnormal behavior detection

Aeyesafe isn't a wearable device — it's voice-activated and operates from a distance with a substantial battery and power supply, and it reports emergencies or abnormalities directly to the caregiver.

2. Alarm.com Wellness

Alarm.com Wellness is a partner to **Alarm.com**, a home security system. The two systems work together to provide comprehensive insight into the behavior and safety of seniors living on their own. The tracker can alert caregivers of abnormal behavior patterns — such as leaving the home at odd hours or wandering, in addition to monitoring light, temperature, and security settings. The system may be paired with personal emergency response (PERS) pendants.

The tracker provides info on:

- Activity levels
- Bathroom use
- Eating habits
- Medication management
- Sleep patterns
- Fires, intruders, or medical emergencies

3. Tru Sense

Tru Sense provides passive monitoring for seniors using a set of connected sensors. The senior monitor system allows you to set alerts, which can monitor your loved one's sleeping patterns, use of doors in the home, and vehicle activity.

All alerts can be sent via text, email, or automated phone calls. It's also connected to a 24-7 emergency response team in case of an accident or intruder.

Tru sense also detects:

- Falls
- Indoor temperatures
- Motion
- Water leaks

4. Rest Assured

Rest Assured offers a range of senior monitoring services that are tailored to and custom-built for each person's needs and home. Family members can access live videos or sensor alerts through a protected portal online. The system can provide remote assistance with medication management and can detect emergencies like falls, fires, and even tornadoes.

Rest assured can detect:

- Motion
- Opening of doors and windows
- Smoke or carbon monoxide
- Glass breaking
- Temperature
- Bed or chair occupancy

Rest assured also offers the unique service of remote caregivers who can provide periodic wellness checks.

5. Lorex Elderly Care Solutions

Lorex Elderly Care Solutions uses a Wi-Fi security camera system to monitor parents remotely. The camera system includes a microphone and speaker, allowing you to check in and communicate with your loved ones using your smartphone. It's compatible with smart homes, can be controlled with no hands, and offers around-the-clock monitoring.

Additional features include:

- Custom motion notifications
- Full HD recording with digital zooming
- Infrared night vision
- No monthly fees
- Live video playback

12. Methodology of E-health

Due to an ageing population and a shortage of hospital beds, it has become a challenge to find new ways to support and care for people with chronic illness living at home. Living with chronic illness changes the lives of those affected, who are often in need of support and nursing care in their homes (1-13). eHealth has the potential to become a means of providing good care at home (57), which is especially challenging with regard to this emerging field (115). eHealth refers to information and communication technology (ICT) tools and services for health, whether the tools are used behind the scenes by healthcare professionals or directly by patients and their relatives [113]. ICT tools can be used to access a wide variety of technological solutions for communication, including text messaging, gathering and monitoring data, diagnosis and treatment at distances, and retrieving electronic health records [111 and 77]. According to the World Health Organization (WHO) [92], eHealth is used in the healthcare for transmission of digital data, including data stored and retrieved electronically to support healthcare, both at the local site and at a distance.

E-Health includes the interaction between patients and health service providers or peer-to-peer communication between patients and/or health professionals. Interest has primarily focused on the use of ICT tools in the care of older [9] and severely chronically ill people [10]. Although ICT has been increasingly used in healthcare in recent years, efforts across countries have been fragmented and could benefit from improved cross-border coordination. eHealth tools and services have been widely introduced and implemented, and the potential benefits ICT can bring people with chronic illness will increase significantly [6].

13. The ICT Methodologies Used in Care Homes

13.1 Video Technology. The most frequently used type of technology was video technology (n = 53); the number includes studies using more than one ICT application. In several of those studies (n = 31), the main focus of the intervention was the use of videophones or videoconferencing. Another use of video technology was to complement patient health monitoring (n = 22). It is notable that web-based video conferencing was used only in a small number of studies (n = 3). In all studies involving parents of children with chronicle illness, video technology was used to communicate.

Video technology was used with different types of applications. Examples of use were guiding patients in their use of medical equipment and to improve self-management, via video-based home telecare services. Another use was teleadvice given by clinical nurse specialists in different areas to community nurses. Videoconferencing was used between patients/family members and healthcare personnel for education and psychosocial or emotional support. Another way to use videoconferencing was to enable interactions between patients and nurses. Consultation via videoconferencing in the patient's home was used instead of visits to the hospital, which enabled access to experts to a greater extent. Virtual nurse visits after, for example, discharge from the hospital, were offered to both patients and family members.

13.2 Text Messages. As shown in many studies (n = 30), a common way of communicating was via text messages. For sending text messages, websites or web-based programs were used in some studies (n = 10). Handheld platforms, such as mobile phones, laptop computers, or text telephones, were used by patients to both send and receive information as well as to communicate (n = 12). In other studies (n = 8), mobile phones or hand held equipment was used to send text messages.

For example, text messages were used for sending messages to patients with self-care advice as a response to symptoms and test results they had reported. Another way to use

Type of technology is divided into three fields of application (most prominent in the included studies).

Total number of studies including this type of technology. The number includes studies using more than one type of technology.

Included in health monitoring, text messages was by electronic diary for home monitoring to improve communication between patients and healthcare professionals. An electronic messaging programme via computers and mobile phones or e-mail and video mail messages was used, enabling nurses and patients to exchange messages to and from anywhere. Via a symptom management system, patients can receive messages in their daily management of symptoms.

13.3 Health Monitoring. About half of the total studies (*n* = 52) included health monitoring, focusing on patients who sent health data to be analyzed by healthcare professionals. In most of the studies that looked at monitoring patient health, text messaging or video technology was used to communicate the data (*n* = 35). Other forms of communication were also used, including the telephone (*n* = 17). Health Buddy, was the most commonly used device for monitoring patient health (*n* = 8). Health Buddy, a system that connects patients in their homes with care providers, is a telehealth device that collects and transmits disease management information about a patient's condition including vital signs, symptoms, and behaviors. Types of patient health data collected from health monitoring systems in real time were, for example, weight, blood pressure, heart rate, and pulse.

14. Methodological Challenges when Designing for a Residential Care Setting

As our usual set of methods and research designs in the area of user- and practice-based computing had proved to be successful in our other projects in several application fields we initially planned the research as in a fairly standard way: an extensive pre-phase based on semi-standardized interviews and participant observation, followed by a diary-study in order to gather an extensive understanding of the living context and of daily routines, of patterns of communication and interactions, and the media use of the residents. We were interested in their every-day activities, their information needs and wishes, as well as their interests in communal activities, such as games, music listening, and watching TV.

We started with interviews with staff and residents who had been proposed by the manager and who had signaled their willingness to talk to us. The interviews with residents took place in their rooms, which are partly furnished with their private furniture and decorative elements, such as family pictures. We deliberately choose the rooms as interview settings in order to be able to integrate talking about personal artifacts during the interview, especially

With ongoing ICT diffusion into the private arena, there will be a demand for new professional roles. Since relatives and interested elderly persons who come to inspect the care home increasingly ask for internet access and about the role of ICT in activities in the house, new tasks and role requirements for the caregivers working in the house become salient. From this stance, our project can be seen in terms of a coupling of professional, organizational and technological development approaches [28]. This means, that we need to have a more sensitive view of the media learning needs and requirements of all stakeholders, and not only the elderly residents. This requires us to give stakeholders training options, and to co-develop new practices around media usage in their daily work.

METHODOLOGIES FOR ENURESIS FOR CARE HOME PATIENTS

Nocturnal enuresis (NE) is a combined symptom of nocturia and urinary incontinence.
Gaining the ability to hold urine through the night is one of the developmental neuro-motor skills of a functioning bladder. 1 NE is considered a physiologic finding in children less than five years of age, but is considered abnormal in adults1. The International Continence Society (ICS) definition for nocturnal enuresis (NE) is any unintended voiding during night-time sleep. 2 This definition lacks duration and frequency.

Regardless of underlying pathology, patients with NE experience discordance between bladder compliance, sphincter efficiency and urine production overnight and often lack of awareness of a sensation to void. Many adults afflicted with NE are affected psychologically.

There is a significantly higher incidence of anxiety, depression, chronic fatigue and lower self-esteem in adults with NE as compared to the general population. 6,15 Significant impact on psychosocial well-being has been noted in Western countries, 2 Middle East countries, 5 and Southeast countries. 9 The relationship between psychological conditions and NE is complex. It is not fully established if these conditions result from NE or exacerbate NE.

Management

Psychosocial stress, and bothersome NE episodes typically prompt treatment. First-line treatment options include lifestyle modifications, behavioral therapy and medical therapy. Other interventions such as surgical intervention, neuromodulation, Botulinum toxin injection to bladder have been used in some patients but are typically reserved as second-line modalities.

Lifestyle modification

Caffeine and sedative avoidance are suggested as they alter sleep cycle function. Alcohol avoidance is suggested due to its effect as a diuretic. Weight reduction can be advantageous through its effects of improving sleep apnea syndrome, and regular physical activity are potential ways to decrease the episodes of NE. 13,18

Behavioural therapy

Although there is data to support time-voiding q2hrs and alarm system in children for NE 26 there is no data in young adults. Furthermore, timed-voiding has a limited role in elderly patients with NE due to decreased adaptive conditioning skills and effect on sleep disturbances. 13,26 Unfortunately, compliance with enuresis alarm systems is low in the adult population with a high withdrawal rate; 4,6 however, when desmopressin failed to control enuresis, adding an alarm system has been reported to increase the response rate by 33%. 2

Adapted Dry Behavioral Therapy (ADBT) is a cognitive behavioral and prompted voiding therapy which includes close observation during sleep, waking up frequently during night (every one hour), alarm use and day-time timed voiding. Although it is effective, high cost and time commitment deter its use commonly. 24Despite successful results in children, behavioral therapy is not as effective in adults. 6 In selected adult cases (infrequent bed wetting, normal sonography and cystometric capacity greater than 300cc) it may have a contributive role. 24

Conclusion

Nocturnal enuresis is a symptom of urinary tract disorder or systemic disease. It requires a standard evaluation consisting of history and physical exam, urinalysis and when indicated urinary ultrasonography, Urine flow rate, frequency volume chart, urodynamic study and cystoscopy. It is recommended that general practitioners refer adults with NE to the urologist for this work-up because of its complexity.

There is minimal role for surgical intervention for this disease, except in specific populations.

However, many patients benefit from long term Desmopressin. Anticholinergics can add benefit even in the absence of OAB symptoms. The role of neuromodulation, onabotulinumtoxin A and surgery are undefined in the literature. Behavioral techniques offer low risk intervention but their time commitment is considerable and they require a high degree of commitment on behalf of the patient to ensure compliance. Future studies should address these shortfalls in the literature to better manage adult patients with NE.

References

A

1. Abbott, S., Shaw, S. and Elston, J. (2014) Comparative analysis of health policy implementation: the use of documentary analysis. Policy Studies, 25 (4) 259 - 266.
2. Abdelhak, M. (2006) Health Information Management of a Strategic Resource. Philadelphia: PA W.B. Saunders Company.
3. Abrahamson, E., (2011) Managerial fads and fashions: the diffusion and rejection of innovations. Acad. Manage. Rev. 7, 586–612.
4.Abrahamson, E., Rosenkopf, L. (2018) When do bandwagon diffusions roll? How far do they go? and when do they roll backwards: A computer simulation. Academy of Management Best Paper Proceedings: 155-159.

5. Addison Wesley. Ash, J.S. (2019) Cross-site Study of the Implementation of Information Technology Innovations in Health Sciences Centres. The Annual Symposium on Computer Applications in Medical Care: 795-799.

6. Ahmed B.A., Hajjam A., Talha S., et al. (2014) E-care: Ontological evolution and improvement of knowledge for the follow-up of heart failure. *MT*, 20(2):79–86

7. AGENAS (Agenzia Nazionale per i Servizi Sanitari Regionali) (2020). PON GOV Cronicità - "Sostenere la sfida alla cronicità con il supporto dell'ICT". Disponibile su: https://www.agenas.gov.it/ricerca-e-sviluppo/pon-gov-cronicita-2018

8. Aichholzer, G., Schmutzer, R. (2019) Bericht/Information E-Government. Elektronische Informationsdienste auf Bundesebene in Österreich. Wien.

9. Aichholzer, G., Schmutzer, R. (2010) Organizational Challenges to the Development of Electronic Government. Proceedings of the 11th International Workshop on Database and Expert Systems Application.

10. Andrès E., Talha S., Benyahia A., et al. (2016) Experimentation of an e-platform to detect situations at risk of cardiac impairment (platform E-care) in an internal medicine unit. *Rev. Med. Interne*, 37:587–593, doi: 10.1016/j.revmed.2016.01.004

11. Aguilar, K. M., Campbell, R. S., Fiester, A., Simpson, R. L., & Hertel, C. (2014). Bringing care home: how telemonitoring can expand population health management beyond the hospital. *Nursing administration quarterly*, 38(2), 166–172.

12. Aikens, J. E., Rosland, A. M., & Piette, J. D. (2015). Improvements in illness self-management and psychological distress associated with telemonitoring support for adults with diabetes. *Primary care diabetes*, 9(2), 127–134. https://doi.org/10.1016/j.pcd.2014.06.003

13. Allemann, H., & Poli, A. (2020). Designing and evaluating information and communication technology-based interventions? Be aware of the needs of older people. *European Journal of Cardiovascular Nursing*, 19(5), 370–372. https://doi.org/10.1177/1474515119897398

14. American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity (2012). Guiding principles for the care of older adults with multimorbidity: an approach for clinicians: American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. *J Am Geriatr Soc*, 60: E1-E25. doi: 10.1111/j.1532-5415.2012.04188.x

15. Alcouffe, S., Berland, N., Levant, Y. (2018) Actor-networks and the diffusion of management accounting innovations: A comparative study. Management Accounting Research, Volume 19, Issue 1, March 2008, Pages 1-17
16. Allan, J., Englebright, J. (2010) Patient-centered documentation an effective and efficient use of clinical information systems. Journal of Nursing Administration 30(2): 90-95.

17. Althsuler, A., Behn, R.D. (2011) Innovation in American government: challenges, opportunities, and dilemmas. Althsuler and Behn editors.
18.Ammenwerth, E., Mansmann, U., Iller, C., Eichstädter, R. (2013) Factors affecting and affected by user acceptance of computer-based nursing documentation: results of a two-year study. Journal of the American Medical Informatics Association: JAMIA, 10(1): 69-84. 253

19. Ammenwerth, E., Kreyer, C., 2018. Digitale Lernwelten in der Pflege, in: Sahmel, K.-H. (Ed.),Hochschuldidaktik der Pflege und Gesundheitsfachberufe. Springer, Berlin, Heidelberg, pp. 155–169. https://doi.org/10.1007/978-3-662-54875-2_14

20. Affisco, John F. and Khalid S. Soliman, 2006, "E-government: A Strategic Operations Management Framework for Service Delivery", Business Process Management Journal, Vol.12, Iss.1, pp-13-21.

21. Asgarkhani, Mehdi, 2015, "Digital Government and its effectiveness in Public Management Reform: A Local Government Perspective", Vol.7, I. 3, pp.465-487.

22. American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity (2012). Guiding principles for the care of older adults with multimorbidity: an approach for clinicians: American Geriatrics Society Expert Panel on the Care of Older Adults with Multimorbidity. *J Am Geriatr Soc*, 60: E1-E25. doi: 10.1111/j.1532-5415.2012.04188.x

23. Anderson, J.G. (2019) Clearing the way for Physicians' Use of Clinical Information Systems. Communications of the ACM 40: 83-90.
24. Anderson, J.G., Stephen, J. (2013) Computers and clinical judgement: The role of physician networks. Social Science & Medicine Volume 20, Issue 10, 1985, Pages 969-979
25. Anderson, G., Aydin, C.E., Kaplan, B. (2015) An analytical framework for measuring the effectiveness/impacts of computer-based patient record systems. In: J.F. Nunamaker, R.H. Sprague, Jr. (Eds.), Proceedings of the 28th Hawaii International Conference on Systems Science, vol. IV, information systemscollaboration systems and technology, organizational systems and technology. IEEE Computer Society Press, Los Alamitos, CA,1995, pp. 767–776.
26. Anderson, J. G., Aydin, C.E. et al. (2015) Evaluating Health Care Information Systems. Health Informatics Series. Springer. London, Sage.

27. Andrès E., Talha S., Benyahia A., et al. (2016) Experimentation of an e-platform to detect situations at risk of cardiac impairment (platform E-care) in an internal medicine unit. *Rev. Med. Interne*, 37:587–593, doi: 10.1016/j.revmed.2016.01.004

28. Anessi Pessina E., Cantù E., Jommi C. (2014) Phasing out market mechanisms in the Italian National Health Service. Public Money & Management, 2004, n. 5: 309-316.
29. Anderson, B. & Tracey, K. (2011). Digital living: the impact (or otherwise) of the Internet on everyday life. American Behavioral Scientist 45(3), 456–475.

30. Arthur, B. (2011) Self-reinforcing mechanisms in economics. In P. Anderson, K. Arrow, & D. Pives (Eds.). The economy as an evolving complex system 9-31. Redwood City, CA:

31. Ash, J.S., Gorman, P.N. et al. (2013). Perceptions of physician order entry: results of a cross-site qualitative study. Methods of Information in Medicine 42: 313-323.
32. Ash, J.S., Gorman, P.N. et al. (2014) Computerized physician order entry in U.S. hospitals: results of a 2002 survey. Journal of the American Medical Informatics Association. JAMIA. 11(2): 95.
33. Ash, J.S. Bates, D.W. (2015) Factors and forces affecting EHR system adoption: report of a 2004 ACMI discussion. Journal Administration Medical Information Association. JAMIA. 12(1): 8-12.

34. Au, N., Ngai, E.W.T., Cheng T.C.E. (2018) Extending the understanding of end user information systems satisfaction formation: An equitable needs fulfillment model approach. MIS Quarterly. (32) 1, pp. 43-66.
35. Au, R., Croll, P. (2018) Consumer-Centric and Privacy-Preserving Identity Management for Distributed E-Health Systems. Proceedings of the 41st Annual Hawaii International Conference on System Sciences (HICSS pp.234)

B

36. B Bacher, I. (2015) Multi-level governance and European Union regional policy. Oxford Universty Press.
37. Balas, E.A. Boran, S.A. (2010) Managing clinical knowledge for healthcare improvement. Yearbook of Medical Informatic. Bethesda, NLM: 65-70.
38. Baldridge, J.V., Burnham, R.A. (2017) Organizational innovation: Individual, organizational, and environmental impacts. Administrative Science Quarterly. Vol. 20, No. 2, Jun., 1975
39. Baorto, D.M., Cimino, J., Parvin. C.A., Kahn M.G. (2017) Using Logical Observation Identifier Names and Codes (LOINC) to exchange laboratory data among three academic hospitals. Journal of the American Medical Informatics Association; 1997;4 (Suppl):96-100.
40. Barlow, S., Johnson, J., Steck, J. (2014) The economic effect of implementing an EMR in an outpatient clinical setting. J Healthc Inf Manag 2014;18(1):46-51.12.
41. Barnett, G. (2013) Innovation: The Basis of Cultural Change. McGraw-Hill Book Company, New York
42. Bartol, K., Srivastava A. (2012) Encouraging knowledge sharing: The role of organizational reward systems. Journal of Leadership & Organizational.
43. Barton, G. (2010) The Parameters Of Government. Australian Journal of Public Administration Volume 38, Issue 1, pages 23–33, March 2010.
44. Bates, D.W., Teich J.M., et al. (2008) Effect of computerized physician order entry and a team intervention on prevention of serious medication errors. Journal of the American Medical Association 280(15): 1311-1316.
45. Bates, D.W., Teich, J.M. et al. (2019) The impact of computerized physician order entry on medication error prevention. Journal of American Medical Information Association 6(4): 313-321.

46. Başbakanlık, 2002, E-Türkiye Girişimi Eylem Planı, Ankara.

47. Blackwell Nikki A. M., Graeme J. Kelly and Lee M. Lenton, 1997, “Telemedicine Ophthalmology Consultation in Remote Queensland”, The Medical Journal of Australia, 167 (11-12), pp.583-586.

48. Balez, R. (2007) Retour sur le contexte : les artéfacts liés à l'influence du cadre institutionnel, des attentes du psychologue et des participants. Bulletin de Psychologie, 60. 103-108.

49. Bates D.W., Teich J.M., Lee J., Seger D., Kuperman G.J., Ma'Luf N. et al. (2016) The impact of computerized physician order entry on medication error prevention. The Journal of the American Medical Informatics Association. 6:313-321.
50. Bates, D.W., Pappius, E, Kuperman, G.J., Sittig, D., Burstinb, H., Fairchild, D. (2015) Using information systems to measure and improve quality. International Journal of Medical Informatics. Volume 53, Issues 2-3, 1 February 1999, Pages 115-124. 255
51. Bates, D.W. (2010) Using information technology to reduce rates of medication errors in hospitals. BMJ. Volume 320, Number 7237 Bates, D.W.,
52. Gawande, A.A. et al. (2013) Improving safety with information technology. New England Journal of Medicine 348(25): 2526-2534.
53. Baum L., Christopher H., Di Maio, A. (2010) Gartner’s Four Phases of Egovernment Model.

Baxter, J., Chua, W.F. (2013) Doing field research: practice and meta-theory in counterpoint. J. Manage. Acc. Res. 10 pp. 68–87.

54. Baxter, J., Chua, W.F. (2013) Alternative management accounting research – whence and whither. Accounting, Organizations and Society, 28, 97-126.

55. Bayoğlu, A. S. (2015), “Yaşlanma Sürecinde Sosyal Dışlanmaya Karşı Güçlendirme Temelli Sosyal Hizmet Müdahalesi”, Sosyal Dışlanma ve Aile: Sosyal Hizmet Müdahalelerinde Güçlendirme Yaklaşımı (Edt: Özkan, Y.), Maya Akademi, Ankara, 123-136.

56. Bazzani, M., Conzon, D., Scalera, A., Spirito, M.A., Trainito, C.I.: 2012

57. Benazzouz, Y., Parissis, I., et al.: 2014

58. Bélanger, F., Carter, L. (2018) Trust and risk in e-government adoption. The Journal of Strategic Information Systems Volume 17, Issue 2, June 2008, Pages 165-176.
59. Bentham, J. (2014) An introduction to the principles of morals and legislation. Claredon Press, Oxford.
60. Benson, T., Naeme, K. (2014) Longman Information and Reference

61. Berner, E., Detmer, D., Simborg, D. (2015). Will the wave finally break? A brief view of the adoption of electronic medical records in the United States. Journal of the American Medical Informatics Association.
62. Berg, M., Langenbert, C., et al. (2009). Considerations for sociotechnical design: experiences with an electronic patient record in a clinical context. International Journal of Medical Informatics 52: 243 – 251
63. Berg, M. (2009) Patient care information systems and healthcare work: a sociotechnical approach. International Journal of Medical Informatics 55, pp. 87– 101.
64. Berg, M., Goorman, E. (2019) The contextual nature of medical information. International Journal of Medical Informatics 55: 51-60.
65. Berg, M. (2011) Implementing information systems in health care organizations: myths and challenges. International Journal Medical Information 64(2-3): 143- 156.
66. Berg, M. (2013) The search for synergy: interrelating medical work and patient care information systems. Methods of information in medicine, 2003, vol 42; part 4, pages 337-344.
67. Berg, M. (2014) Health information management. London, Routledge. 256
68. Bergen, C., Berg, M. (2014) Meeting the challenge: Integrating quality improvement and patient care information systems. Cap.5 di Health Information Management by Marc Berg Publisher: Taylor & Francis In Routledge London
69. Berner, E.S., Detmer, D.E., et al. (2015) Will the wave finally break? A brief view of the adoption of electronic medical records in the United States. Journal of the American Medical Informatics Association: JAMIA 12(1): 3.

70. Bertel, D., Leitner, P., Geser, G., Hornung-Prähauser, V., Psihoda, S. & Zgud, J. (2018). *AAL Vision 2025 für Österreich unter Einbeziehung relevanter Stakeholder und internationaler Trends*. Studienbericht im Rahmen des Technologieprogramms benefit. Wien. Available at https://www.aalvision.at/aal-vision-2025/
71. Borgonovi E., Filetti S., Lopane F., et al. (2021). Condizioni organizzative abilitanti per le terapie digitali in Italia. *Tendenze Nuove Numero Speciale 1*. Pagg. 133-146.

72. Brewer L.C., Fortuna K.L., Jones C., Walker R., Hayes S.N., Patten C.A., Cooper L.A. (2020). Back to the future: achieving health equity through health informatics and digital health. *JMIR Mhealth Uhealth*; 8: e14512. Doi: 10.2196/14512

73. Bijker W.E., Law, J. (2011) Studies in Sociotechnical Change, MIT. Press, Cambridge Editors, Shaping Technology-Building Society Bingham,
74. B.D. (2012) Innovation, bureaucracy, and public policy: a study of innovation adoption by local government. The Western Political Quarterly 31(2): 178-205
75.Birkmeyer, C.M., Bates, D.W., et al. (2012). Will electronic order entry reduce health care costs?.Effective Clinical Practice 5(2): 67-74.
76. Bjørnenak, T., (2013) Diffusion and accounting: the case of ABC in Norway. Manage. Acc. Res. 8 (2), 3–17.
77. Bjørnenak, T., Olson, O. (2015) Unbundling management accounting innovations. Manage. Acc. Res. (10), 325–338.
78. Blaikie, N. (2010) Designing social research: the logic of anticipation. Polity Press, Malden, MA.
79. Boyer, C; Selby, M; Scherrer, J R; Appel, R D. (2019) The Health On the Net Code of Conduct for medical and health Websites. Comput Biol Med. Sep;28(5):603–10.
80. Borgonovi, E. (2011) Strategie dell'innovazione Rivista Italiana Di Comunicazione Pubblica. Franco Angelini editore.
81. Born, C., Carbajal, M., Smith, P., Wallace, M., Abbott, K., Adyanthaya, S., Boyd, E.A., Keller, C., Liu, J., New, W., (2014) Contract Optimization at Texas Children's Hospital. Interfaces providence then Maryland Institute Of Management Sciences Then Institute For Operations Research And The Management Sciences. Vol 34; Part 1, pages 51-58
82. Borzekowski, R. (2013) Measuring the Cost Impact of Hospital Information Systems: 1987-1994. Finance and Economics Discussion Series 2002-2042. Board of Governors of the Federal Reserve System. Washington, DC.

83. Bhavnani S.P., Parakh K., Atreja A., Druz R., Graham G.N., Hayek S.S., Krumholz H.M., Maddox T.M., Majmudar M.D., Rumsfeld J.S., Shah B.R. (2017). Roadmap for Innovation-ACC Health Policy Statement on Healthcare Transformation in the Era of Digital Health, Big Data, and Precision Health: A Report of the American College of Cardiology Task Force on Health Policy Statements and Systems of Care. J Am Coll Cardiol; 70(21):2696-2718. doi: 10.1016/j.jacc.2017.10.018

84. Bowers, J. (2015) Making it work: a field study of a ‘CSCW Network’. Inf. Soc. 11, pp. 189–207.

85. Bozeman, B., Bretschneider, S. (2014) The “Publicness Puzzle” in Organization Theory: A Test of Alternative Explanations of Differences between Public and 257 Private Organizations. Jnl. of Public Admin. Research and Theory Volume4, Issue2 Pp. 197-224.
86. Brandeberry, A. (2013). Determinants of adoption for organisational innovations approaching saturation. European Journal of Innovation Management 6(3): 150- 158
87. Brandyberry, A. (2013) Determinants of adoption for organisational innovations approaching saturation. European Journal of Innovation Management Volume 6 . Number 3 . 2003 . pp. 150-158.
88. Brennan TA, Gawande A, Thomas E, Studdert D. (2015) Accidental Deaths, Saved Lives, and Improved Quality. N Engl J Med ;353:1405–1409.
89. Bradford, M.G., Kent, W.A. (2012) Human Geography . Theories and Their Applications. Oxford University Press.

90. B. Cherry, M. Carter, D. Owen, C. Lockhart, Factors affecting electronic health record adoption in longterm care facilities, J. Qual. Assur. 30 (2) (2018) 37-47.

91. Bradley, E.H. (2017) Qualitative data analysis for health services research: developing taxonomy, themes, and theory. Health Services Research 2007
92. Braithwaite, R.L. (2019) Health Issues in the Black Community, John Wiley and Sons, 2009.
93. Bretschneider , Stuart , and D. Wittmer. (2013) Organizational Adoption of Microcomputer Technology: Th e Role of Sector. Information Systems Research 4 (1): 88 – 108 .
94. Briers, M. and Chua, W.F. (2012) The role of actor-networks and boundary objects in management accounting change: a field study of an implementation of activity-based costing. Acc. Organ. Society 26 (2002), pp. 237–269.
95. Brown John Seely and Duguid Paul (2011) Knowledge and Organization: A Social-Practice Perspective. Organization Science Vol. 12, No. 2 (Mar. - Apr., 2001), pp. 198-213
96. Brown J. S. ,Paul Duguid (2012) The social life of information. Harvard Bussiness School Press
97. Brown, W.H. (2014) Innovation in the Machine Tool Industr. Quarterly Journal of Economics, Vol. 71 pp. 406-425.
98. Brudney J.L. and Selden S. Coleman (2018). The adoption of innovation by smaller local governments: the case of computer tecnology. American Review of Public Administration 25(1): 71-86.
99. Bryan S.; Parry D. (2012) Structural reliability of conjoint measurement in health care: an empirical investigation. Applied Economics, Volume 34, Number 5, 20 March 2002 , pp. 561-567(7). Routledge, part of the Taylor & Francis Group. 258
100. Bryan C, Boren SA (2018) The use and effectiveness of electronic clinical decision support tools in the ambulatory/primary care setting: a systematic review of the literature. Inform Prim Care 16: 79–91.
101. Bryman, A. (2011) Social Research Methods, Oxford: Oxford University Press.
102. Bryman, A. (2018) Social Research Methods. 2th ediction Oxford:Oxford University Press,
103. Brynjolfsson, E., Yang, S. (2011), Information Technology and Productivity: a Review of the Literature in Advances in Computers. MIT Academic Press, vol. 43, 179-214.
104. Buccoliero, L., Caccia, C., Nasi, G. (2012) Il sistema informativo dell'azienda sanitaria. Milan:
McGraw-Hill Italia. Burns, F. (2019) Information for Health. Leeds NHS Executive, A1103.
105. Burke, D.E., Wan, T.T. H. (2012) Exploring Hospitals' Adoption of Information Technology. Journal of Medical Systems 2012, Volume 26, Number 4, 349-355.
106. Byars, L.L. (2016) Legal challenges created by computerized medical records. Top Health Inf Manage. May;16(4):61-5
107. Byars, L.L. (2019) Strategic management: Planning and implementation:concepts and cases. Harper & Row (New York, NY)
108. Bygholm, A. (2011) End-user support: a necessary issue in the implementation and use of EPR systems. Stud Health Technol Inform. 2001;84(Pt 1):604-8.

109. Blythe, M., Wright, P., Bowers, J., et al. Age and experience: ludic engagement in a residential care setting. *Proceedings of the 8th ACM Conference on Designing Interactive Systems*, ACM (2010), 161-170.
110. Bohlmeijer, E. Reminiscence and depression in later life (Dissertation).2007. http://dare.ubvu.vu.nl/bitstream/ 1871/12886/2/proefschrift_reminiscence_and_depression_in_later_life.pdf (15.09.2011)

111. B. J. Lutz, N. R. Chumbler, T. Lyles, N. Hoffman, and R. Kobb, “Testing a home-telehealth programme for US veterans recovering from stroke and their family caregivers,” Disability and Rehabilitation, vol. 31, no. 5, pp. 402–409, 2009.

C

112. C Caccia, C. (2010) Management dei sistemi informativi in sanità. Milano, Mc Graw Hill.
113. Caccia, C. (2018) Management dei sistemi informativi in sanità. 2e. Milano, Mc Graw Hill.
114. Caccia C., Cucciniello, M., Nasi G.(2009) Gli impatti della cartella clinica elettronica: un modello di misurazione degli effetti sull'azienda. Mecosan 2009; 18:45-57.
115. Caccia, C., Cucciniello M., Nasi G. (2009) La valutazione degli impatti della cartella clinica elettronica, Rapporto OASI Egea, p.521-547 259
116. Cagwin, D., Bouwman, M.J., (2012) The association between activity-based costing and improvement in financial performance. Management Accounting Research, Vol.13, No.1, pp.1-39.
117. Car, J., Black, A., Anandan, C., Cresswell, K., Pagliari, C., McKinstry, B., Procter, R., Majeed, A., Sheikh, A. (2008) The Impact of eHealth on the Quality & Safety of Healthcare: A systematic overview & synthesis of the literature. Birmingham. NHS Connecting for Health Evaluation Programme.
118. Čas, J., Rose, G., Schüttler, L., 2017. Robotik in Österreich: Kurzbericht – Entwicklungsperspektiven und politische Herausforderungen. Endbericht (No. ITA 2017-03), Institut für Technikfolgen-Abschätzung. Österreichische Akademie der Wissenschaften, Wien. https://doi.org/10.1553/ITA-pb-2017-03
119. Christensen, T., Lægreid, P. (2014) New public management: the trade-off between political governance and administrative autonomy. Governance. Volume 20, Issue 3, pages 499–520, July 2007
120. Christensen, M., and Yoshimi, H. (2011), "A two-country comparison of public sector performance reporting: the tortoise and hare?", Financial Accountability & Management, Vol. 17, No. 3, pp. 2 71-289.
121. Choi, P., Walker, R., 2019. Remote Patient Management: Balancing Patient Privacy, Data Security, and Clinical Needs. Remote Patient Manag. Perit. Dial. 197, 35–43. https://doi.org/10.1159/000496312

122. Caporuscio, M., Raverdy, P.G., Issarny, V.: 2012

123. Chen, L., Nugent, C., Okeyo, G.: 2014

124. Comunicazione della Commissione Europea al Parlamento Europeo, al Consiglio, al Comitato Economico e Sociale Europeo e al Comitato delle Regioni sulla telemedicina a beneficio dei pazienti, dei sistemi sanitari e della società – COM (2008)689

125. Cristea, C.; Pasarica, A.; Andruseac, G.; Dionisie, B.; Rotariu, C. A wireless ECG acquisition device for remote monitoring of heart rate and arrhythmia detection. In Proceedings of the 2015 E-Health and Bioengineering Conference (EHB), Iasi, Romania, 19–21 November 2015; pp. 1–4.

126. Coleman BJ (2019) European models of long-term care in the home and community - International Journal of Health Services, 1995 – Baywood
127. Callon, M., (2003) Some elements of the sociology of translation: domestication of the scallops and the fisherman of St Brieuc Bay. In: Law, J. (Ed.), Power, Action and Belief. Routledge & Kegan Paul, London, pp. 196–233.
128. Callon, M. (2001) Writing and (re)writing devices as tools for managing complexity. In: Law, J., Mol, A. (Eds.), Complexities in Science, Technology And Medicine. Duke University Press, Durham, NC, pp. 191–217.
129. Canfield K., Silva M., and Petrucci K. (2009) The standard data model approach to patient record transfer. Proc Annu Symp Comput Appl Med Care. 1994: 478– 482.
130. Cannon, D.S., Allen, S.N. (2010) A comparison of the effects of computer and manual reminders on compliance with a mental health clinical practice guideline. Journal of the American Medical Informatics Association: JAMIA 7(2): 196-203.
131. Capocchi, A. (2003) Il processo di e-government nel sistema delle amministrazioni pubbliche. Milano: Giuffrè, 2003

132. Cavallo, F., Pujol, L., Garcia, A., & Dario, P. (2010). The AALIANCE research agenda on ICT for ageing well. Gerontechnology, 9(2):181-182

133. Cartwright, M., Hirani, S.P., Rixon, L., Beynon, M., Doll, H., Bower, P., Bardsley, M., et al. (2013), "Effect of telehealth on quality of life and psychological outcomes over 12 months (Whole Systems Demonstrator telehealth questionnaire study): nested study of patient reported outcomes in a pragmatic, cluster randomised controlled trial.", BMJ (Clinical research ed.), Vol. 653 No. February, p. F653.

134. Cankurtaran, E. S. and E. Eker, (2007), "Being Elderly in a Young Country: Geriatric Psychiatry in Turkey", International Journal of Mental Health, 36: 3, 66-72.

135. Cavallo, F., Pujol, L., Garcia, A., & Dario, P. (2010). The AALIANCE research agenda on ICT for ageing well. Gerontechnology, 9(2):181-182

136. Coenen, L., Hansen, T., & Rekers, J. V. (2015). Innovation Policy for Grand Challenges. An Economic Geography Perspective. Geography Compass, 9(9), 483–496.

137. Costa-Font, J. & Courbage, C. (eds) (2012), Financing Long-Term Care in Europe: Institutions, Markets and Model, Basingstoke: Palgrave Macmillan.

138. Carroll, G.R., Hannan, M.T. (2009) Density dependence in the evolution of populations of newspaper organizations. American Sociological Review, 54: 524- 541.
139. Cassell, C., Symon, G. (2008). Qualitative research in work contexts. In C. Cassell, G. Symon (Eds.), Qualitative methods in organizational research (pp. 1- 13). Thousand Oaks, CA: Sage Publications. 260
140. Cassel, C. Symon, G. (2009) Qualitative methods in organizational research: A practical guide. Sage London
141. Chen,J.C. Dolan, M.Lin, B (2004). Improve processes on health: current issues and future trends. International Journal of Electronic Healthcare 1 (2):149-164.
142. Child, J., Smith, C. (2009) The context and process of organizational transformation. Journal of Management Studies, Vol. 24 pp.565-93.
143. Chin H. L., McClure P. (2010) Evaluating a comprehensive outpatient clinical information system: a case study and model for system evaluation. Proc Annu Symp Comput Appl Med Care 1995:717–721.
144. Christensen, M., Yoshimi, H. (2013) Sector Performance Reporting: New Public Management and Contingency Theory Insights Government. Auditing Review Volume10 (March 2003)
145. Chua, W.F. (2018). Experts, networks and inscriptions in the fabrication of accounting images: a story of the representation of three public hospitals. Acc. Organ. Society 20 pp. 111–145. Chung S., Snyder, C. (2018), ERP

146. Chiatti C., Masera F., Rimland J.M., Cherubini A., Scarpino O., Spazzafumo L. (2013). The UP-TECH project, an intervention to support caregivers of Alzheimer's disease patients in Italy: study protocol for a randomized controlled trial. *Trials*; 14(1):1–11. doi: 10.1186/1745-6215-14-155

147. Chiatti C., Malmgren Fänge A., Schmidt S.M., Nilsson M.H., Carlsson G., Liwander A., Dahlgren Bergström C., Olivetti P., Johansson P. (2017). The TECH@HOME study, a technological intervention to reduce caregiver burden for informal caregivers of people with dementia: study protocol for a randomized controlled trial. *Trials*; 18:63. doi: 10.1186/s13063-017-1796-8

148. Campanella P., Lovato E., Marone C., Fallacara L., Mancuso A., Ricciardi W., Specchia M.L. (2016). The impact of electronic health records on healthcare quality: a systematic review and meta-analysis. *The European Journal of Public Health*, 26(1), 60-64. doi: 10.1093/eurpub/ckv122

149. Companion Series, "Telemedicina: ieri e oggi", Website: http://www.networksecondoparere.it/data/repository/2622019a1db68b6f9/vadal_latelemedicinaierieoggi.pdf

150. Charue-Duboc, F., Amar, L. & Raulet-Croset, N. (2010). La téléassistance pour le maintien à domicile. Rapport de recherche pour la Caisse Nationale de Solidarité et d'Autonomie. PREG-CRG, Ecole Polytechnique – CNRS. Retrieved http://www.cnsa.fr/IMG/pdf/Rapport_teleassistance-V_Finale-2010.pdf. [Accessed 10 march 2012].

151. Comunicazione della Commissione Europea al Parlamento Europeo, al Consiglio, al Comitato Economico e Sociale Europeo e al Comitato delle Regioni sulla telemedicina a beneficio dei pazienti, dei sistemi sanitari e della società – COM (2008)689

152. Campbell, F.K. *Contours of ableism: The production of disability and abledness*. Palgrave Macmillan, 2009.

153. Clarkson, J. *Inclusive design: design for the whole population*. Springer, 2003.

154. Cristea, C.; Pasarica, A.; Andruseac, G.; Dionisie, B.; Rotariu, C. A wireless ECG acquisition device for remote monitoring of heart rate and arrhythmia detection. In Proceedings of the 2015 E-Health and Bioengineering Conference (EHB), Iasi, Romania, 19–21 November 2015; pp. 1–4.

155. Colesca, S. E., and Dobrica, L. (2018) E-government Adoption in Romania. World Academy of Science, Engineering and Technology 42 2008.

156. Collins J. C., Porras J. I. (2011) Organizational vision and visionary organizations. California Management Review, -34-1 pp30-52

157. Conklin, W.A. (2017) Barriers to adoption of e-Government, System Sciences. HICSS 2007. 40th Annual Hawaii International Conference on System Sciences.

158. Cooke D. P., Peterson W. J. (2019) Sap Implementation: Strategies and Results. Conference Board (June 24, 1998)

159. Coursey, D., Norris, D.F. (2018). "Models of e-Government: Are they correct? An empirical Assessment." Public Administration Review, 2008

160. Craigavon and Banbridge Community Health and Social Services Trust. (2010) Community Development in Health and Social Services - the Craigavon and 261 Banbridge Experience. Gilford: Craigavon and Banbridge Community Health and Social Services Trust.

161. Cresswel, K.M., Worth, A., Sheikh, A. (2010) Actor-Network Theory and its role in understanding the implementation of information technology developments in healthcare, BMC Medical Informatics and Decision Making 2010, volume 10.

162. Crotty, S.N. (2015) Bureaucratic Competition in the Policy Process. Policy Studies Journal Volume 33, Issue 3, August 2005, Pages: 341–361.

163. Currie, W. (2016) IT enabled healthcare delivery:the Uk National Health Service, Information Systems Management

164. Czarniawska, B. (2008). A narrative approach to organization studies. Thousand Oaks, Calif.: Sage Publications.

D

165. Daikeler, R. Götz, U. & Waibel, S. (2015). *Diabetes. Evidenzbasierte Diagnosik und Therapie*. 10. Auflage. Sinsheim

166. Doorn-van Atten, V., Marije, N., De Groot, L. C., De Vries, J. H., & Haveman-Nies, A. (2018). Determinants of Behaviour Change in a Multi-Component Telemonitoring Intervention for Community-Dwelling Older Adults. *Nutrients*, *10*(8), 1062.

167. Dourado, I., Magno, L., Soares, F., Massa, P., Nunn, A., Dalal, S. & Grangelro, A. (2020). Adapting to the COVID-19 Pandemic: Continuing HIV Prevention Services for Adolescents Through Telemonitoring, Brazil. *AIDS and Behavior*, 24, 1994–1999. https://doi.org/10.1007/s10461-020-02927-w

168. Deliberazione n. X/6164. Governo della domanda: avvio della presa in carico di pazienti cronici e fragili. Determinazioni in attuazione dell'art. 9 della legge n. 23/2015. La Giunta Regione Lombardia 2017

169. Deliberazione n. X/6551. Riordino della rete di offerta e modalità di presa in carico dei pazienti cronici e/o fragili in attuazione dell'art. 9 della legge regionale n. 33/2009. La Giunta Regione Lombardia 2017

170. Damanpour, F., Euan W.M., (2013) Organisational innovation and performance: the problem of organizational lag. Administrative Science Quarterly, 29: 392-409

171. Damanpour F (2014) The adoption of technological, administrative, and ancillary innovations: Impact of organizational factors. Journal Of Management, Winter 1987vol. 13 no. 4 675-688

172. Damanpour, F. (2015) Organizational innovation: a meta analysis of effects of determinants and moderators. Academy of Management Journal, Vol. 34 pp.555- 90.

173. Damanpour, F. (2011) Organizational complexity and innovation: developing and testing multiple contingency models. Management Science 42(5): 693-716.

174. Dameri, R.P. (2005) La valutazione dell'Information Technology in azienda. Torino, Isedi. Darbyshire, P. (2000) User-friendliness of computerized information systems. Computers in Nursing 2000; 18(2):93-99.

175. Davenport, T.H. (2010) The Future of Enterprise System -enabled Organizations, Information System Frontiers, 2 163-180State and local e-government: Prospects and challenges KD Edmiston-State and local e-government: Prospects and challenges. American Review of Public Administration,Volume: 33, Issue: 1, Pages: 20

176. Damant, J. (2014). Older adults, e-inclusion and access to ICT-based care. PhD Thesis. The London School of Economics and Political Science.

177. Damant, J., Knapp, M., Watters, S., Freddolino, P. & Ellis, M. (2013). The impact of ICT services on perceptions of the quality of life of older people. Journal of Assistive Technologies, Vol. 7 No. 1, pp. 521.

178. De Moore, G. (2011) Standardisation in health care informatics and telematics in Europe: CEN 251 activities. In De Moore, C. McDonald and J. Noothoven van 262 Goor (eds.): Progress in standardization in health care informatics. IOS Press: Amsterdam.

179. Decreto Ministeriale 12 marzo 2019 pubblicato sulla Gazzetta Ufficiale 14 giugno 2019 "Nuovo Sistema di Garanzia per il Monitoraggio della Assistenza Sanitaria"

180. De, S., Barnaghi, P., Bauer, M., Meissner, S.: 2011

181. Delicato, F.C., Pires, P.F., Batista, T.: 2013

182. Duarte, P.H., Faina, L.F., Camargos, L.J., de Paula, L.B., Pasquini, R.: 2016

183. Delpierre, C., Cuzin, L., Fillaux, J., Alvarez, M., Massip, P., Lang, T. (2014) A systematic review of computer-based patient record systems and quality of care: more randomized clinical trials or a broader approach? Int J Qual Health Care. 2004 Oct;16(5):407-16.

184. DeLone, W.D., McLean E.R., (2013) The DeLone and McLean model of information systems success: a ten year update. Journal of Management Information System

185. De Moore, G. 2003. Standardisation in health care informatics and telematics in Europe: CEN 251 activities. In De Moore, C. McDonald and J. Noothoven van Goor (eds.): Progress in standardization in health care informatics. IOS Press: Amsterdam. pp. 1-13.

186. Demirel, Ahmet, 2013, Sağlık Hizmetleri Yönetiminde Sağlık Bilgi Sistemleri ve Kullanım Modülleri, Beykent Üniversitesi Sosyal Bilimler Enstitüsü Yayınlanmamış Yüksek Lisans Tezi, İstanbul.

187. Diaz, Joseph A., Griffith Rebecca A. et. al, 2002, Patient's Use of Internet for Medical Information, Journal Gen Intern Medicine, 17 (3), pp.180-185.

188. Denis, J.L., Hebert Y., Langley, A,. Lozeau, D., Trottier, L.H. (2012). Explaining Diffusion Patterns for Complex Health Care Innovations. Health Care Management Review 27(3):60–73.

189. Dent, J. (2012) Accounting and organizational cultures: a field study of the emergence of a new organizational reality. Acc. Organ. Society 16 pp. 705–732

190. Denzin, N.K. (2013) Interpretive interactionism. In: Morgan, G. (Ed.), Beyond Method. Sage Publications, Newbury Park, CA.s 19(4): 9-30.

191. Devaraj, S., Fan M., Kohli, R. (2012) Antecedents of B2C Channel Satisfaction and Preference: Validating e-Commerce Metrics. Information System Research 2002;13: 316-333.

192. Devaraj S., Kohli R. (2012) The IT Payoff: measuring the business value of information technology investments. Financial Times Prenctice Hall, NJ

193. Di Maggio, P.J., Powell, W.W., (2013) The iron cage revisited: Institutional isomorphism and collective rationality in organizational field. American Sociological Review, 48, 147-160.

194. Die Presse, 2018. Patientenanwalt für Forschung mit Elga-Daten [WWW Document]. Presse. URL https://www.diepresse.com/5405275/patientenanwalt-fur-forschung-mit-elga-daten (accessed 3.24.21).

195. Dülger, İ. (2012), "Dünyada ve Türkiye'de Yaşlılığın Değişen Görünümü, Değişen Politikaları ve Gelişen Aktif Yaşlanma Kavramı", Kuşaklararası Dayanışma ve Aktif Yaşlanma Sempozyumu, Ankara.

196. Dogac A, Yuksel M, Avci A, Ceyhan B, Hulur U, Eryilmaz Z, et al. Electronic Health Record Interoperability as Realized in Turkey's National Health Information System. Methods Inf Med 2011;50(2);140-9.

197. Doolin, B., Lowe, A. (2012) To reveal is to critic: actor-network theory and critical information systems research. Journal of Information Technology, 17(2): p.69-78.

198. Donahue A. K., (2019) Government Management Capacity: A Comparative Analysis of City. Human Resources Management Systems Oxford University Press Doolan DF, Bates DW, James BC. The use of computers for clinical care: A case series of advanced US sites. Journal of the American Medical Informatics Association, 2003;10:94-107 263

199. Doran B, DePalma JA. (2011) Plan to assess the value of computerized documentation system: adaptation for an emergency department. Topics in Emergency Medicine 1996; 18(1):63- 73.

200. Drazin, R., Schoonhoven, C. (2019). Community, Population, And Organization Effects On Innovation: A Multilevel Perspective. Academy Of Management Journal, Vol. 39 Issue 5, P1065-1083 Dubin, R. 1978. Theory building. New York: The Free Press. E Edmiston,

201. D.K. (2013) State and local e-government: Prospects and challenges, American Review Of Public Administration 2003, Volume: 33, Issue: 1, Pages: 20. Eng, E.R. (2001). The ehealth Landscape: a terrain map of emerging information and communication technologies in health and health care. Princeton (NJ)The robert Wood Jonhson Foundation

E

202. El Attaoui A., Largo S., Jilbab A., Bourouhou A. (2020) Machine Learning Application for Blood Pressure Telemonitoring over Wireless Sensors Network. In: Masrour T., El Hassani I., Cherrafi A. (Eds.), *Artificial Intelligence and Industrial Application*s. A2IA 2020. Lecture Notes in Networks and Systems, 144. Springer, Cham, 78-90. https://doi.org/10.1007/978-3-030-53970-2_7

203. El Fezazi, M., Jbari, A. & Jilbab, A. (2020). Machine Learning Application for Blood Pressure Telemonitoring over Wireless Sensors Network. In: *Artificial Intelligence and Industrial Applications.* Artificial Intelligence Techniques for Cyber-Physical, Digital Twin Systems and Engineering Applications. Springer International Publishing, 78-90.

204. Egyed, M.T., 2018. Elga-Abmeldungen durch Datendebatte verdoppelt [WWW Document]. Stand. URL https://www.derstandard.at/story/2000078107466/nach-kritik-an-datenschutzverdoppelt-sich-zahl-der-elga-abmeldungen (accessed 3.22.21).

205. Elderly home CAre Residential Engagement (E.CA.R.E.) finanziato dal programma 2014 - 2020 INTERREG V-A Italy - Austria. E.CA.R.E. - Elderly home CAre Residential Engagement Toolkit per lo sviluppo delle competenze digitali degli anziani.

206. European Parliament, 2017. Regulation (EU) 2017/745 of the European Parliament and of the Council of 5 April 2017 on medical devices, amending Directive 2001/83/EC, Regulation (EC) No 178/2002 and Regulation (EC) No 1223/2009 and repealing Council Directives 90/385/EEC and 93/42/EEC, Regulation (EU) 2017/745.

207. Essén, A. (2008). The two facets of electronic care surveillance: an exploration of the views of older people who live with monitoring devices. *Social science & medicine*, *67*(1), 128-136.

208. Eslami, S., Abu-Hanna, A., De Jonge, E,. De Keizer, N.F. (2009) Tight glycemic control and computerized decision-support systems: a systematic review. Intensive Care Med 35: 1505–1517.

209. Eslami S, Keizer NF, Abu-Hanna A (2018) The impact of computerized physician medication order entry in hospitalized patients-A systematic review. Int J Med Inform 77: 365–376.

210.E.N. Munyisia, P. Yu, D. Hailey, The changes in caregivers' perceptions about the quality of information and benefits of nursing documentation associated with the introduction of an electronic documentation system in a nursing home, Int. J. Med. Inform. 80 (2) (2011) 116-126.

211. E. Coiera, When conversation is better than computation, J. Am. Med. Inf. Assoc. 7 (3) (2010) 277-286.

212. E. Coiera V. Tombs, Communication behaviours in a hospital setting: an observational study, BMJ 316 (2018).

213.European Lung Fundation, “Telemedicina”, Website: https://www.europeanlung.org/assets/files/it/publications/telemedicine-it.pdf

214. European Commission (2011). How to promote active ageing in Europe — EU support to local and regional actors. Brussels: EU.

215. European Commission. (2012). eHealth Action Plan 2012-2020 - Innovative healthcare for the 21st century. COM 736 final. Brussels: European Commission.

216. E-health – when, not if , 2016, http://www.euro.who.int/en/home

217. Health Connect, 2011, http://www.health.gov.au/healthconnect

218. Essin DJ, Dishakjian R., deCiutiis VL, Essin CD, Steen SN. Development and Assessment of a Computer-Based Preanesthetic Patient Evaluation System for Obstetrical Anesthesia. Journal of Clinical Monitoring and Computing 2008; 14: 95-100.

219. Eysenbach, G. (2011). What is e-health?. Journal of Medical Internet Research 3(2): e20-e22.

220. E.-K. Loh, L. Flicker, B. Horner, Attitudes toward information and communication technology (ICT) in residential aged care in Western Australia, J. Am. Med. Dir. Assoc. 10 (6) (2009) 408-413.

221. E.C. Beuscart-Zéphir, S. Pelayo, F. Anceaux, J.-J. Meaux, M. Degroisse, P. Degoulet, Impact of CPOE on doctor–nurse cooperation for the medication ordering and administration process, Int. J. Med. Inform. 74 (7–8) (2005) 629-641.

222. E. Wang, P. Yu, D. Hailey, Description and comparison of quality of electronic versus paper-based resident admission forms in Australian aged care facilities, Int. J. Med. Inform. 82(5) (2013):313-24.

223. E.-Y. Qian, P. Yu, Z.-Y. Zhang, D. Hailey, P. Davy, M. Nelson, The work pattern of personal care workers in two Australian nursing homes: a time-motion study, BMC Health Serv. Res. 12 (1) (2012) 305.

224. E.J. Saleem, A.L. Russ, A. Neddo, P.T. Blades, B.N. Doebbeling, B.H. Foresman, Paper persistence, workarounds, and communication breakdowns in computerized consultation management, Int. J. Med. Inform. 80 (7) (2011) 466-479.

F

225.Faber, E. (2013) Designing business models for mobile ICT services, 16th Bled Electronic Commerce Conference eTransformation Bled, Slovenia, June 9 - 11, 2003. 264

226.Ferlie, E., Pettigrew, A., Ashburner, Fitzgerald, L (2011) The New Public Managementin Action. Oxford University Press, Oxford, UK.

227.Ferlie, E., MacLaughlin, K., Osborne, P. (2011) New Public Management: current trends and future prospects. London: Routledge Fennell,

228. Fernandez, J. L., Forder, J., Trukeschitz, B., Rokosova, M. & McDaid, D. (2009). How Can European States Design Efficient, Equitable and Sustainable Funding Systems for Long-Term Care for Older People? Policy Brief, Copenhagen: World Health Organization, Regional Office for Europe and European Observatory on Health Systems and Policies.

229.F.L.,Warnecke, R.B. (2012) The diffusion of medical innovations: An applied network analysis. Plenum Press (New York)

230.Fichman, R.G.(2014) Information Technology Diffusion. A Review of Empirical Research

231.Fichman, R. G., R. Kohli, and R. Krishnan (2008) Call for papers for a special issue of Information Systems Research in the role of information systems in healthcare organizations: Synergies from an interdisciplinary perspective. Information SystemsResearch.

232. Fitzgerald, L., Ferlie, E., Wood M., Hawkins, C.. 2012. Interlocking Interactions, the Diffusion of Innovations in Health Care. Human Relations 55(12):1429–49.

233. Fink, M., 2018. ESPN Thematic Report on Challenges in long-term care Austria. The European Social Policy Network.

234. Flynn, N. e Strehl, F. (2018), Public sector manangement in Europe. Londres/Nova York, Harvester Wheatsheaf.

235. Fur-Musquer É., Delamarre-Damier F., Sonnic A., et al (2012). Are there any predictive factors for unphased hospitalization of EHPAD residents? *Geriatr Psychol Neuropsy-chiatr Old*, 10(2):137–142. doi: 10.1684/pnv.2012.0344

236. Foucault, M. (2019) The Order of Things: An Archaeology of Human Sciences. Tavistock, London. Fortin, Y., Van Hassel, H. (2000) Contracting in the new public management: from economics to lawand citizenship. Amsterdam: IOS Press.

237. Fountain, J. (2011) Building the virtual state. Washington D.C.,Brookings Institution Press 2001

238. Frederickson, H.G., Smith, K.B. (2013) The public administration theory primer. Westview Press.

239. Freeman, C., Soete L. (2018) Work for all or mass unemployment? Pinter.

240. Freeman, R., Smith-Merry J., Sturdy S. (2009) WHO, Mental Health and Europe. Report to the European Commission. Knowand Pol Orientation 3, supra-national case study. Louvian-la-Neuve: Universite Catholique de Louvain.

241. Filipova, A. A. (2015). Health information exchange capabilities in skilled nursing facilities. *CIN: Computers, Informatics, Nursing*, *33*(8), 346-358.

242. Furlanis, G., Ajčević, M., Naccarato, M., Caruso, P., Scali, I., Lugnan, C., Buoite Stella, A., & Manganotti, P. (2020). e-Health vs COVID-19: home patient telemonitoring to maintain TIA continuum of care. *Neurological sciences*, 41(8), 2023–2024. https://doi.org/10.1007/s10072-020-04524-0

G

243. Gall, W., Aly, A.-F., Sojer, R., Spahni, S., Ammenwerth, E., 2016. The national e-medication approaches in Germany, Switzerland and Austria: A structured comparison. Int. J. Med. Inf. 93, 14–25. https://doi.org/10.1016/j.ijmedinf.2016.05.009

244. Ghai S. (2020). Teledentistry during COVID-19 pandemic. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 14(5), 933-935. doi:10.1016/j.dsx.2020.06.029

245. Gentry M.T., Lapid M.I., Rummans T.A. (2019) Geriatric Telepsychiatry: Systematic Review and Policy Considerations. *The American Journal of Geriatric Psychiatry* (27): 2, 109-127 doi:10.1016/j.jagp.2018.10.009

246. Gusarova, A. (2012). Data Protection in Telemedicine. *SHS Web of Conferences*. 2, 00013. 10.1051/shsconf/20120200013.

247. Granovetter, M. (2O15) Economic Action and Social Structure: the Problem of Embeddedness. American Journal of Sociology, Nov.:481-510.

248. Green, L., M. Kreuter (2015) Health Promotion Planning: An education and ecological approach, 4th ed. New York, NY: McGraw-Hill.

249. Greenhalgh, T., Potts, H.W., Wong, G., Bark, P., Swinglehurst, D. (2019) Tensions and paradoxes in electronic patient record research: a systematic literature review using the meta-narrative method. Milbank Q 87: 729–788.

250. Greenhalgh, T., Robert, P. Bate, P., Kyriakidou, O., Macfarlane, F., Peacock, R. (2015). Diffusion of Innovations in Health Service Organisations: A Systematic Literature Review. Oxford: Blackwell.

251. Greenhalgh, T., Robert, P., Macfarlane, F., Bate, P., Kyriakidou, O. (2014) Diffusion of innovations in service organizations:systematic review and recommendations. The Milbank Quarterly. 82:4 581-629.

252. Griesemer, J.R. (2019) Accountants' and administrators' guide: Budgeting for results in government. John Wiley & Sons. New York.

253. Griessemer, J.R. (2019) Microcomputers in Local Government. Washington, D.C.: International City Management Association

254. Giovanni Serpelloni, “Dalla telemedicina alla web clinic (Wc): Internet Come “Infrastruttura”, Website: http://www.giovanniserpelloni.it/pdf/pdf188.pdf

255. Güleş Hasan Kürşat ve Musa Özata, 2005, Sağlık Bilişim Sistemleri, Nobel Yayınevi, Ankara.
Gates, Bill ve Hamingway C., 1999, Dijital Sinir Sistemiyle Düşünce Hızında Çalışmak, Kitapçılık, İstanbul.

H

256. Hajkowicz, S. & Dawson, D. (2018). *Digital Megatrends: A perspective on the coming decade of digital disruption*. CSIRO Data61.
257. Hare, N., Bansal, P., Bajowala, S. S., Abramson, S. L., Chervinskiy, S., Corriel, R., Hauswirth, D. W., Kakumanu, S., Mehta, R., Rashid, Q., Rupp, M. R., Shih, J. & Mosnaim, G. S. (2020). Work Group Report: COVID-19: Unmasking Telemedicine. *The Journal of Allergy and Clinical Immunology: In Practice*, 8(8), 2461-2473. https://doi.org/10.1016/j.jaip.2020.06.038

258. Hainzl, C., Juen, I., 2020. Telemed Monitor Österreich. Akzeptanz von telemedizinischer Betreuung durch ÄrztInnen im niedergelassenen Bereich, Telemde Monitor. Donau-Universität Krems, Krems.

259. Haluza, D., Jungwirth, D., 2015. ICT and the future of health care: aspects of health promotion. Int. J. Med. Inf. 84, 48–57. https://doi.org/10.1016/j.ijmedinf.2014.09.005

260. Haluza, D., Naszay, M., Stockinger, A., Jungwirth, D., 2016. Prevailing Opinions on Connected Health in Austria: Results from an Online Survey. Int. J. Environ. Res. Public. Health 13, 813. https://doi.org/10.3390/ijerph13080813

261. Health Transformation Program [cited November 11, 2013]. Available from: http://www.saglik.gov.tr/TR/belge/1-2906/saglikta-donusum-programi.html

262. Hakkennes S., Craft L., Jones M. (2020) Hype Cycle for Digital Care Delivery Including Telemedicine and Virtual Care. ID: G00441722

263. Hilbert, S., Hindricks, G. (2020). Telemedizin und EKG-Monitoring. *Herzschrittmachertherapie+ Elektrophysiologie*, 31, 260–264. https://doi.org/10.1007/s00399-020-00715-6

264. Haniffa, G., Hudaib, R., and Mirza, M. (2005) Accounting Policy Choice Working Paper Series 05/15.

265. Hanna, E.L. (2011) The relation between volume and outcome in health care. New England Journal of Medicine. Harris-Equifax (1996) Consumer privacy survey, conducted for Equifax by Louis Harris and Associates in association with Dr Alan Westin of Columbia University.Atlanta, GA: Equifax.

266. Hartswood, M., Procter, R., Rouncefield, M.,Slack R. (2011) Making a Case in Medical Work: Implications for the Electronic Medical Record. Computer Supported Cooperative Work (CSCW) Volume 12, Number 3, 241-266.

267. Hibbert P.D., Wiles L.K., Cameron I.D., Kitson A., Reed R.L., Georgiou A., Gray L., Westbrook J., Augustsson H., Molloy C.J., Arnolda G., Ting H.P., Mitchell R., Rapport F., Gordon S.J., Runciman W.B., Braithwaite J. (2019) CareTrack Aged: the appropriateness of care delivered to Australians living in residential aged care facilities: a study protocol. BMJ, 9: e030988. doi:10.1136/bmjopen-2019-030988

268. H.C.A., Lira Neto J.C.G., Moura de Araújo M.F., Nunes Carvalho G.C., Regina de Souza Teixeira C., Freire de Freitas R.W.J., Coelho Damasceno M.M. (2018) Telecoaching programme for type 2 diabetes control: a randomised clinical trial. *British Journal of Nursing*, (27): 19 doi:10.12968/bjon.2018.27.19.1115

I-I

269. Initiation-A Historical Perspective- AMCIS Ciborra, C. (2002) The Labyrinths of Information: Challenging The Wisdom of Systems. Oxford University Press, Oxford Cimino JJ,

270. I. Fichman, R. Kohli, R. Krishnan, The role of information systems in healthcare: Current research and future trends, Inf. Syst. Res. 22 (3) (2011) 419-428.

271. Ilinca, S., Leichsenring, K., Rodrigues, R., 2015. From care in homes to care at home: European experiences with (de)institutionalisation in long-term care. European Center for Social Welfare Policy and Research, Vienna.

272. I.L. Alexander, M. Rantz, M. Flesner, M. Diekemper, C. Siem, Clinical information systems in nursing homes: An evaluation of initial implementation strategies, CIN. 25 (4) (2007) 189-197

273. I. Kaplan K.D. Harris-Salamone, Health IT success and failure: Recommendations from literature and an AMIA workshop, J. Am. Med. Inf. Assoc. 16 (3) (2009) 291-299.

274. I.M. Unertl, M.B. Weinger, K.B. Johnson, N.M. Lorenzi, Describing and modeling workflow and information flow in chronic disease care, J. Am. Med. Inf. Assoc. 16 (6) (2009) 826-836.

275. I. Lammintakanen, K. Saranto, T. Kivinen, Use of electronic information systems in nursing management, Int. J. Med. Inform. 79 (5) (2010) 324-331.

276. I. Lorenzi, A. Kouroubali, D. Detmer, M. Bloomrosen, How to successfully select and implement electronic health records (EHR) in small ambulatory practice settings, BMC Med. Inform. Decis. Mak. 9 (1) (2009) 15.

277. ISS (2013). *Sperimentazione Passi d'Argento: verso un sistema nazionale di sorveglianza della popolazione ultre64enne*. Rapporti ISTISAN, 13(9)
Işık, A. H., Güler İ., 2010, "Teletıpta Mobil Uygulama Çalışması ve Mobil İletişim Teknolojilerinin Analizi", Bilişim Teknoloji Dergisi, 3 (1), ss.1-10.

278. İzci, F., 2001, Bilişim Teknolojilerinin Kamu Örgütleri Üzerindeki Etkileri ve Sağlık Bakanlığı Örneği, Cumhuriyet Üniversitesi Sosyal Bilimler Enstitüsü, Yayınlanmamış Doktora Tezi, Sivas.

J

279. Jamal, A., McKenzie, K., Clark, M. (2009) The impact of health information technology on the quality of medical and health care: a systematic review. HIM J 38: 26–37.

280. Jervis, F., Plowden, S. (2003) The Impact of Political Devolution on the UK's Health Services. London: Nuffield Trust, 2003. Jick, T.D. (1979). Mixing qualitative and quantitative methods: Triangulation in action, Administrative Science Quarterly, 24, 602-611.

281. Johanson, V., Martensson, F., Skoog. B. (2011) Mobilizing change through the management control of intangibles. Acc. Organ. Society 26 , pp. 715–733.

282. Johannessen, A., Olsen, B., Lumpkin G.T. (2011) Innovation as newness: what is new, how new, and new to whom?. European Journal of Innovation Management, 2001, PAG 21-31

283. Jones, T.C., Dugdale, D., (2012) The ABC bandwagon and the juggernaut of modernity. Acc. Organ. Society 27, pp. 121–163. Joos, D., Chen, Q. et al. (2006) An Electronic Medical Record in Primary Care: Impact on Satisfaction, Work Efficiency and Clinic Processes. AMIA Annual Symposium Proceedings: 394-398.

284. Jorgensen, H.C. (2013) Retention and productivity strategies for nurse manager. J.B. Lippincott (Philadelphia). K Kalra, D. (1994) Medicine in Europe: Electronic health records – the European Scene. BMJ, 309, p.1358-61.

285. Jubadi, W.M.; Sahak, S.F. Heartbeat monitoring alert via SMS. In Proceedings of the 2009 IEEE Symposium on Industrial Electronics & Applications, Kuala Lumpur, Malaysia, 4–6 October 2009; pp. 1–5.
286. Jaana, M., Sherrard, H., & Paré, G. (2019). A prospective evaluation of telemonitoring use by seniors with chronic heart failure: Adoption, self-care, and empowerment. *Health informatics journal*, *25*(4), 1800-1814.
287. Jaly, I., Iyengar, K., Bahl, S., Hughes, T. & Vaishya, R. (2020). Redefining diabetic foot disease management service during COVID-19 pandemic. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, 14(5), 833-838. doi:10.1016/j.dsx.2020.06.023
288.. Jankowski, N., Schönijahn, L., & Wahl, M. (2017). Telemonitoring in home care: creating the potential for a safer life at home. In *Safe at Home with Assistive Technology* (pp. 81-93). Springer, Cham.
289. Jongsma, K. R., van den Heuvel, J., Rake, J., Bredenoord, A. L., & Bekker, M. N. (2020). User Experiences With and Recommendations for Mobile Health Technology for Hypertensive Disorders of Pregnancy: Mixed Methods Study. *JMIR mHealth and uHealth*, 8(8), e17271. https://doi.org/10.2196/17271
290. Jonker, L. T., Haveman, M. E., de Bock, G. H., van Leeuwen, B. L., & Lahr, M. M. (2020). Feasibility of Perioperative eHealth Interventions for Older Surgical Patients: A Systematic Review. *Journal of the American Medical Directors Association*.
291. J.S. Ash, D.F. Sittig, R. Dykstra, E. Campbell, K. Guappone, The unintended consequences of computerized provider order entry: Findings from a mixed methods exploration, Int. J. Med. Inform. 78, Supplement 1 (2009) S69-S76.

292. J.F. Sittig, J.S. Ash, K.P. Guappone, E.M. Campbell, R.H. Dykstra, Assessing the anticipated consequences of computer-based provider order entry at three community hospitals using an openended, semi-structured survey instrument, Int. J. Med. Inform. 77 (7) (2008) 440-447.

293. J. Koppel, J.P. Metlay, A.Cohen, B. Abaluck, Role of computerized physician order entry systems in facilitating medication errors, JAMA. 293 (10) (2005) 1197-1203.

294.J.A. Vogelsmeier, J.R.B. Halbesleben, J.R. Scott-Cawiezell, Technology implementation and workarounds in the nursing home, J. Am. Med. Inf. Assoc. 15 (1) (2008) 114-119.

295.J. Koppel, T. Wetterneck, J.L. Telles, B.-T. Karsh, Workarounds to barcode medication administration systems: Their occurrences, causes, and threats to patient safety, J. Am. Med. Inf. Assoc. 15 (4) (2008) 408-423.

296.J.T. Scott, T.G. Rundall, T.M. Vogt, J. Hsu, Kaiser Permanente's experience of implementing an electronic medical record: a qualitative study, BMJ 331 (7528) (2005) 1313-1316.

297. J.A. Linder, J. Ma, D.W. Bates, B. Middleton, R.S. Stafford, Electronic health record use and the quality of ambulatory care in the United States, Arch. Intern. Med. 167 (13) (2007) 1400-1405.

K

298. Kannel, H.W.B.; Kannel, C.; Paffenbarger, R.S.; Cupples, L.A. Heart rate and cardiovascular mortality: the Framingham Study. Am. Heart J. 2011, 113, 1489–1494.
299. Kanter, R.M (2013), Supporting innovation and venture development in established companies. Journal of Business Venturing, Vol. 1 pp.47-60.

300. Kanter, R., Stein, B.A.et al. (2010) The challenge of organizational change: how companies experience it and leaders guide it. New York, Free Press.

301. Kaplan, B., Lundsgaarde, H.P. (2020) Toward an evaluation of an integrated clinical imaging system: identifying clinical benefits. Methods of Information in Medicine 35(3):221-229.

302. Karagel, D. Ü. (2011), "The Distribution of Elderly Population in Turkey and the Factors Effecting This Distribution", International Journal of Social Sciences and Humanity Studies, Vol 3, No 1, 59-69.

303.. Kazley A.S., Ozcan, Y.A. (2019) Organizational and environmental determinants of hospital EMR adoption: a national study. Journal of medical systems, 31, 5, 375-84.

304. Keller, S.D., Ware, J.E. et al. (2019) Testing the equivalence of translations of widely used response choice labels: results from the IQOLA Project. International Quality of Life Assessment. Journal Clinical Epidemiol 51: 933-944.

305. Keller, G., Teufel, T. (2018) SAP R/3 process-oriented implementation: Iterative process prototyping. Addison Wesley Longman (Harlow, England and Reading, Ma.)

306. Kelly, G. (2016) Patient data, confidentiality and electronics. BMJ 316: 718-719. Keen, P.G.W. (1991) Shaping the Future. Boston, Harvard Business School Press.

307. Keen, J. (2016) Should the National Health service have and information strategy? Public Administration 3

308. Kerr, D., Butler-Henderson, K., Sahama, T., 2019. Security, Privacy, and Ownership Issues With the Use of Wearable Health Technologies [WWW Document]. Cyber Law Priv. Secur. Concepts Methodol. Tools Appl. https://doi.org/10.4018/978-1-5225-8897-9.ch079

309. Krick, T., Huter, K., Domhoff, D., Schmidt, A., Rothgang, H., & Wolf-Ostermann, K. (2019). Digital technology and nursing care: A scoping review on acceptance, effectiveness and efficiency studies of informal and formal care technologies. *BMC Health Services Research*, 19, 400. doi:10.1186/s12913-019-4238-3 2019

310. Kim, K., Gollamudi, S. S., & Steinhubl, S. (2017). Digital technology to enable aging in place. *Experimental Gerontology*, 88, 25–31, doi:10.1016/j.exger.2016.11.013

311. Kuziemsky, C., Maeder, A. J., John, O., et al. (2019). Role of artificial intelligence within the telehealth domain. *Yearbook of Medical Informatics*, 28(1), 35–40.l doi: 10.1055/s-0039-1677897

312. Koch, J., 2020. Wearables – Megatrend der Gesundheitswirtschaft - VDE [WWW Document]. vde.com. URL https://www.vde.com/topics-de/health/aktuelles/wearables-megatrend-der-gesundheitswirtschaft (accessed 3.22.21).

313. Kratky, W., 2020. Möglichkeiten und Grenzen von Telemedizin und Digital Health in der Geriatrie am Beispiel teletherapeutische Nachsorge.

314. Kovner, C., Schuchman, L., Mallard, C. (2017) The application of pen-based computer technology to home health care. Computers in Nursing (1997) Volume: 15, Issue: 5, Pages: 237-244

315. Kraemer K.L., King J. L. (2017) Computers and local government. ACM SIGCAS Computers and Society. Volume 8 Issue 2, Summer 1977. Praeger (New York).

316. Kraemer, K.L. (2016) Strategic computing and administrative reform. In Dunlop, C. e Kling, R. Computerization and controversy: value conflicts and social choices (pp. 167-180) Boston, Academic Press.

317. Kraemer. K.L., Dedrick, J. (2018) Computing and Public Organizations. Jnl. of Public Admin. Research and Theory Volume7, Issue 1Pp. 89-112.

318. Kraemer, K.L. (2011) Globalization of E-Commerce. Center for Research on IT and OrganizationsGraduate School of Management, UCI. E-Business Center Director's Forum, 2001

319. K.R. Ministero della Salute (2013). Criteri di Appropriatezza clinica, tecnologica e strutturale nell'assistenza al paziente complesso. Quaderni del Ministero della Salute

320. K.Fur-Musquer É., Delamarre-Damier F., Sonnic A., et al (2012). Are there any predictive factors for unphased hospitalization of EHPAD residents? *Geriatr Psychol Neuropsy-chiatr Old*, 10(2):137–142. doi: 10.1684/pnv.2012.0344

321. Koppel M., Onwuteaka-Philipsen B.D., Pasman H.R., Bernabei R., Carpenter I., Denkinger M.D., Onder G., van der Roest H.G., Topinkova E., van Hout H.P.J. (2018). Are older long term care residents accurately prognosticated and consequently informed about their prognosis? Results from SHELTER study data in 5 European countries. *PLoS ONE*, 13(7): e0200590 doi:10.1371/journal.pone.0200590

322. Kidholm K., Ekeland A.G., Jensen L.K., Rasmussen J., Pedersen C.D., Bowes A., Flottorp S.A. and Bech M. (2012) A MODEL FOR ASSESSMENT OF TELEMEDICINE APPLICATIONS: MAST. *Cambridge University*, 28:44-51 doi:10.1017/S0266462311000638

323. K.C. Elderly home CAre Residential Engagement (E.CA.R.E.) finanziato dal programma 2014 - 2020 INTERREG V-A Italy - Austria. E.CA.R.E. - Elderly home CAre Residential Engagement Toolkit per lo sviluppo delle competenze digitali degli anziani.

324. Kamin S.T., Beyer A., Lang F.R. (2020) Social support is associated with technology use in old age. Z Gerontol Geriat, 53:256–262 doi:10.1007/s00391-019-01529-z

325. Krick, T., Huter, K., Domhoff, D., Schmidt, A., Rothgang, H., & Wolf-Ostermann, K. (2019). Digital technology and nursing care: A scoping review on acceptance, effectiveness and efficiency studies of informal and formal care technologies. *BMC Health Services Research*, 19, 400. doi:10.1186/s12913-019-4238-3 2019

326. Kim, K., Gollamudi, S. S., & Steinhubl, S. (2017). Digital technology to enable aging in place. *Experimental Gerontology*, 88, 25–31, doi:10.1016/j.exger.2016.11.013

327. Kuziemsky, C., Maeder, A. J., John, O., et al. (2019). Role of artificial intelligence within the telehealth domain. *Yearbook of Medical Informatics*, 28(1), 35–40.l doi: 10.1055/s-0039-1677897

L

328. Lapsley, I., Wright, E. (2014) The diffusion of management accounting innovations in the public sector: a research agenda. Management Accounting Research, Vol. 15 pp.355-74.

329. Lapsley, I. (2018). The NPM Agenda: Back to the Future. Financial Accountability and Management (published by Blackwell Publishers)

330. Lapsley, I. (2019) New Public Management: Cruellest Invention of the Human Spirit?. Abacus (published by Blackwell Publishers).

331. Latour, B., Woolgar, F. (2011) Laboratory Life: The Social Construction of Scientific Facts. Sage, London.

332. Latour B. (2010) Science in Action: How to Follow Scientists and Engineers Through Society. Harvard University Press, Cambridge, MA

333. La fondazione Istud,“Telemedicina e doctor web: l'eHealth che rinnova la Sanità”, Website: http://service.istud.it/up_media/pw_scienziati/telemedicina.pdf

334. Latour, B. (2009) Aramis, or the love of technology. Cambridge, MA: Harvard University Press.

335. Leonardi, C., Mennecozzi, C., Not, E., Pianesi, F. & Zancanaro, M. (2008). Designing a familiar technology for elderly people. In: 6th International Conference of the International Society for Gerontechnology, ISG`08. Retrieved from http://i3.fbk.eu/en/system/files/Leonardi_Designing+Familiar+technology.pdf. [Accessed 10 march 2012].

336. Legge Regionale 11 agosto 2015, n. 23 Evoluzione del sistema sociosanitario lombardo: modifiche al Titolo I e al Titolo II della legge regionale 30 dicembre 2009, n. 33 (Testo unico delle leggi regionali in materia di sanità)

337. Leijdekkers, V.G.P. A Health Monitoring System Using Smart Phones and Wearable Sensors. Int. J. ARM 2007, 8, 29–36.

338. Lavradim, S. T. (2019). *Effectiveness of telehealth interventions as a part of secondary prevention in coronary artery disease: a systematic review and meta-analysis.* Faculty of Nursing, Department of Internal Medicine Nursing, University of Akdeniz, Antalya, Turkey.

339. Lang, C., Scheibe, M., Voigt, K., Hübsch, G., Mocke, L., Schmitt, J., Bergmann, A. & Holthoff-Detto, V. (2019). Motive für die Nichtakzeptanz und Nichtnutzung einer Telemonitoring-Anwendung im häuslichen Umfeld durch multimorbide Patienten über 65 Jahre. *Zeitschrift für Evidenz, Fortbildung und Qualität im Gesundheitswesen*, 141-142, 76-88. https://doi.org/10.1016/j.zefq.2019.02.009

340. Lindberg, B., Nilsson, C., Zotterman, D., Söderberg, S. & Skär, L. (2013). Using Information and Communication Technology in Home Care for Communication between Patients, Family Members, and Healthcare Professionals: A Systematic Review. *nternational journal of telemedicine and applications*, 461829. https://doi.org/10.1155/2013/461829

341. Liua P., Lib G., Jiangc S., Liub Y., Lengb M., Zhaob J., Wangb S., Mengb X., Shangb B., Chenb L., Huangd S. H. (2019) The effect of smart homes on older adults with chronic conditions: A systematic review and meta-analysis. *Geriatric Nursing*, 40: 522-530 doi:10.1016/j.gerinurse.2019.03.016

342. Lunardini, F., Borghese, N. A., Piccini, L., Bernardelli, G., Cesari, M., & Ferrante, S. (2020). Validity and usability of a smart ball–driven serious game to monitor grip strength in independent elderlies. *Health Informatics Journal*, 26(3), 1952–1968. https://doi.org/10.1177/1460458219895381

343. Landicho, L.C.L.; Magbalon, I.R.; Reyes, C.P.S. A wireless electrocardiography in superintending cardiac rate extremes with global positioning capability to remotely localize specimen. In Proceedings of the 2015 IEEE International Conference on Control System, Computing and Engineering (ICCSCE), Penang, Malaysia, 27–29 November 2015; pp. 141–145.

344. L, Shishehgar M., Kerr D., Blake J. (2019) The effectiveness of various robotic technologies in assisting older adults. *Health Informatics Journal*, 25(3) 892-918 doi: 10.1177/1460458217729729

345. L, Shishehgar M., Kerr D., Blake J. (2018) A systematic review of research into how robotic technology can help older people. Smart Health, (7-8): 1-18 doi:10.1016/j.smhl.2018.03.002

346.L. Stefanopoulou E., Lewis D., Taylor M., Broscombe J., Ahmad J., Larkin J. (2018) Are Digitally Delivered Psychological Interventions for Depression the Way Forward? A Review. *Psychiatr Q*, 89:779–794 doi:10.1007/s11126-018-9576-5

347. Liua P., Lib G., Jiangc S., Liub Y., Lengb M., Zhaob J., Wangb S., Mengb X., Shangb B., Chenb L., Huangd S. H. (2019) The effect of smart homes on older adults with chronic conditions: A systematic review and meta-analysis. *Geriatric Nursing*, 40: 522-530 doi:10.1016/j.gerinurse.2019.03.016

M

348. Mensink, G.B.M.; Hoffmeister, H. The relationship between resting heart rate and all-cause, cardiovascular, and cancer mortality. Eur. Heart J. 2019, 18, 1404–1410.

349. Marino A., Pariso P. (2019). *E-government and Its Impact on National Economic Development: A Case Study Concerning Southern Italy*. In Proceedings of the 2019 3rd International Conference on E-commerce, E-Business and E-Government (pp. 1-4). ACM.

350. Marino A., Pariso P. (2020). *From digital divide to e-government: reengineering process and bureaucracy in public service delivery*, Electronic Government, An International Journal. doi: 10.1504/EG.2020.10027735

351. Mairinger, T., Netzer, T., Gschendtner, A., 1997. The legal situation of telemedicine in Austria. J. Telemed. Telecare 3, 154–157. **https://doi.org/10.1258/1357633971931066**

352. Marino A., Pariso P., Landriani L. (2020). E Health and Electronic Health Record: The Italian experience in the European Context. Research Square; 1-11. doi: 10.21203/rs.3.rs-31655/v1

353. Martini N., Calabria S., Recchia G., Ciani O. (2021). Terapie digitali, HTA e rimborso in Italia. *Tendenze Nuove Numero Speciale 1*. Pagg. 111-122.

354. Michele Zagra , Stefania Zerbo , Antonina Argo, “Informatica, web e telemedicina”, Website: https://core.ac.uk/download/pdf/53283303.pdf

355. Ministero della Salute (2016). Piano Nazionale della Cronicità. Accordo tra lo Stato, le Regioni e le Province Autonome di Trento e di Bolzano

356. Ministero della Salute. Patto per la Salute 2019-2021

357. Mintzberg, H. (2009) Managing Government, Governing management. Harvard Business review june 96 pag 75-83.

358. Mintzberg, H., Glouberman, S. (2010) Managing the Care of Health and the Cure of Disease. Part II: Integration

359. Mitchell, E., Sullivan, F. (2011) A descriptive feast but an evaluative famine: systematic review of published articles on primary care computing during 1980- 97. BMJ 322: 279–282.

360. Moon, M.J. (2012) The evolution of e-Government among municipalities: rhetoric or reality? Public Administration Review 62(4): 424-433.

361. Muigg, D., Kastner, P., Modre-Osprian, R., Haluza, D., Duftschmid, G., 2018. Is Austria Ready for Telemonitoring? A Readiness Assessment Among Doctors and Patients in the Field of Diabetes. Stud. Health Technol. Inform. 248, 322–329.

362. Ministero della Salute (2013). Criteri di Appropriatezza clinica, tecnologica e strutturale nell’assistenza al paziente complesso. Quaderni del Ministero della Salute

363. Ministero della Salute (2020). ICT per la Salute. PON Governance e Capacità Istituzionale 2014-2020. Disponibile su: http://www.pongovernance1420.gov.it/it/progetto/ict-per-la-salute/

364. Moore, M., Hartley, J. (2018) Innovations in Governance. Public Management Review, Vol 10, 1 71-88

365. M. Berg, Implementing information systems in health care organizations: myths and challenges, Int. J. Med. Inform. 64 (2–3) (2011) 143-156.

366. M. Goorman M. Berg, Modelling nursing activities: electronic patient records and their discontents, Nursing Inquiry 7 (1) (2010) 3-9.

367. M.C. Beuscart-Zéphir, F. Anceaux, V. Crinquette, J.M. Renard, Integrating users’ activity modeling in the design and assessment of hospital electronic patient records: the example of anesthesia, Int. J. Med. Inform. 64 (2–3) (2011) 157-171.

368. M.J. Jiang, W.A. Muhanna, G. Klein, User resistance and strategies for promoting acceptance across system types, Inf. Manage. 37 (1) (2010) 25-36.

369. M. Masso G. McCarthy, Literature review to identify factors that support implementation of evidencebased practice in residential aged care, Int. J. Evid. Based Healthc. 7 (2) (2019) 145-156.

N

370. Norley, J. E. (2016). Telemedicine: Coming to nursing homes in the near future. *Journal of the American Medical Directors Association*, *17*(1), 1-3.

371. Nimako, K., Lu, S. K., Ayite, B., Priest, K., Winkley, A., Gunapala, R., Popat, S. & O'Brien, M. E. (2013). A pilot study of a novel home telemonitoring system for oncology patients receiving chemotherapy. *ournal of telemedicine and telecare*, 19(3), 148-152. doi: 10.1177/1357633X13483258.
372. Noel, K. & Ellison, B. (2020). Inclusive innovation in telehealth. *NPJ Digital Medicine*, *3*(1), 89. https://doi.org/10.1038/s41746-020-0296-5
373. Nogueira, M. S. (2020). Biophotonic telemedicine for disease diagnosis and monitoring during pandemics: overcoming COVID-19 and shaping the future of healthcare. *Photodiagnosis and photodynamic therapy*, 31, 101836. https://doi.org/10.1016/j.pdpdt.2020.101836
374. Nelson, R.R., Winter, S.G. (2018) An Evolutionary Theory of Economic Change. Harvard University Press, Cambridge, MA.

375. Nittari, G., Khuman, R., Baldoni, S., Pallotta, G., Battineni, G., Sirignano, A., Amenta, F., Ricci, G., 2020. Telemedicine Practice: Review of the Current Ethical and Legal Challenges. Telemed. E-Health 26, 1427–1437. https://doi.org/10.1089/tmj.2019.0158

376. Norris, D.F., Kraemer, K.F. (2018) Mainframe and PC Computing in American Cities: Myths and Realities. Center for Research on Information Technology and Organizations.

377. Norris, D.F., Moon, M.J. (2015) Advancing E-Government at the Grassroots: Tortoise or Hare? Public Administration Review 65(1): 64-75.

378. Norris D.F. (2019) E-Government among American Local Governments: Adoption, Impacts, Barriers and Lessons Learned. The International Conference for Administrative Development:Towards Excellence in Public Sector Performance Riyadh, Saudi Arabia November 1-4, 2009

379. Nedovic-Budic, Z., Godschalk, D.R. (2005) Human factors in adoption of geographic information systems: a local government case study. Public Administration Review 56(6): 554-567.

380. Niazkhani, Z. (2009) A Fit between Clinical Workflow and Health Care Information Systems - PhD Thesis, Erasmus University Rotterdam, October 2009.publishing.eur.nl

381. Nolan, R.L. (1979), Managing the crises in data processing. Harvard Business Review, Vol. 57 (2):115-26.

382. Nohria, N, Gulati, R (1996) Is slack good or bad for innovation? Academy of Management Journal, Vol. 39 No.5, pp.1245-64.

O-Q

383. Oh, H., Rizo, C., Enkin, M., Jadad, A. (2015) What is eHealth (3): a systematic review of published definitions. J Med Internet Res 7: e1.

384. Oleson, F., Markussen, R., (2013) Reconfigured medicine: writing medicine in a sociotechnical practice. Configurations. 2003;11:351-381. 279

385. O'Neill, H.M., Pouder, R.W., Buchholtz, A., Patterns, K. (1998) The Diffusion of Strategies across Organizations: Insights from the Innovation Diffusion Literature. The Academy of Management Review Vol. 23, No. 1 (Jan., 1998), pp. 98-114

386. Osborne, S., Brown, K. (2015) Managing change and innovation in pubblic service organization. Routledge

387. Osborne, S. (2019) Naming the beast delivering and classifying service innovation in social policy. Human Relations 1998; 51 : 1133-54

388. Osborne, S. (2016) The new public governance? Public Management Review. Osborne, S., Gaebler, T. (1993) Reinventing government: How the entrepreneurial spirit is transforming the public sector.

389. Oxford, Radcliffe Medical Press. Øvretveit, J. (2014) A Framework for quality improvement translation: understanding the conditionality of interventions. Joint Commission Journal on Quality and Safety (GLobal Supplement, August): 15-24.

390. Øvretveit, J., Granberg, C. (2016) Evaluation of the implementation of an electronic medical. Tockholm.

391. Øvretveit, J. Scott, T., Rundall, T.G., Shortelle, S.M., Brommelsa, M. (2007) Implementation of electronic medical records in hospitals: two case studies. Health Policy 84:181–190

392. Quattrone, P., Hopper, T. (2011) What does organizational change mean? Speculations on a taken for granted category. Manage. Acc. Res. pp. 403–435.

P

393. Pabst, M.K., Scherubel, J.C., Minnick, A.F. (2019) The impact of computerized documentation on nurses' use of time. Comput Nurs. 1996 Jan-Feb;14(1):25-30.

394. Pagliari, C., Sloan, D., Gregor, P., Sullivan, F., Detmer, D., Kahan, G.P, Oortwijn,W., MacGillivray,S. What Is eHealth (4): A Scoping Exercise to Map the Field. Journal of Medical Internet Research 2015.

395. Pagliari, C., Detmer, D., Singleton, P. (2017). Electronic Personal Health Records – Emergence and implications for the UK. London: Nuffield Tru

396. Pagliari, C. (2017) Pragmatism is required if the benefits of EHR are to be realised. BMJ 2007; 335: 158 280

397. Pagliari, C. (2017) Design and Evaluation in eHealth: Challenges and Implications for an Interdisciplinary Field. Journal of Medical Internet Research 9(2):e15)

398. Pagliari, C., Detmer, D. et al. (2017) Potential of electronic personal health records. BMJ 335(330-333).

399. Pagliari, C., Detmer, D., Singleton, P. (2019) So there are problems with NPfIT. Time for a reality check? BMJ;338:b643

400. Pasini P., Marzotto M., Perego A. (2015), La misurazione delle prestazioni dei sistemi informativi aziendali. Egea, Milano.

401. Perera, S., McKinnon, J.L., Harrison, G.L., (2013) Diffusion of transfer pricing innovation in the context of commercialisation: a longitudinal case study of Government Trading Enterprise. Manage. Acc. Res. 14 (2), 140–164.

402. Pervan, G. (2017) An investigation of factors affecting technology acceptance and use decisios by Australian allied health therapist, 40th Annual Hawaii International Conference on System Science, HICSS 07 , 1:07

403. Pettigrew, A.M. (2019) The Awakening Giant: Continuity and Change in ICI. Basil Blackwell, Oxford,

404. Presidenza del Consiglio dei Ministri (2020). OT11-OT2 · Rafforzamento della CAPACITÀ AMMINISTRATIVA e DIGITALIZZAZIONE della PA. PON Governance e Capacità Istituzionale 2014-2020. Disponibile su: https://ot11ot2.it/dfp-organismo-intermedio/progetti/sostenere-la-sfida-alla-cronicita-con-il-supporto-dellict

405. Premkumar, G., Ramamurthy, K. (2019) Implementation of electronic data interchange: an innovation diffusion perspective. Journal of Management Information Systems. Special section: Strategic and competitive information systems archive Volume 11 Issue 2, September 1994

406. Pizziferri, L., Kittler, A.F., Volk, L.A., Honour, M.M., Gupta, S., Wang, S., Wang, T., Lippincott, M., Li, Q., Bates, D.W. (2015)

407. Primary care physician time utilization before and after implementation of an electronic health record: a timemotion study. J Biomed Inform 2015;38(3):176-88.

408. Pollit, C., Bouckaert, G. (2010) Public Management Reform. A Comparative Analysis. Oxford: Oxford University Press.

409. Porteous, T., Bond, C., Robertson, R., Hannaford, P., Reiter, E. (2013) Electronic transfer of prescriptionrelated information: comparing views of patients, general practitioners, and pharmacists. Br J Gen Pract. 2003 Mar;53(488):204-9.

410. Powell, A., Koput T. et al. (2006) Interorganizational collaboration and the locus of innovation: Networks of learning in biotechnology. Administrative science quarterly, 1996 – JSTOR

411. Preece D., Steven V, Steven G. (2009) Quality Management in public house retailing. Cap. 9 of book Understanding, managing, and implementing quality: frameworks, techniques and cases. Routledge. 281

412. Prior, L. (2013). Using documents in social research. London: Sage.

413. Prior, L. (2018), Repositioning documents in social research. Sociology, Vol. 42 No. 5, pp. 821-36.

414. Protti, D., Peel, V. (2009) Critical success factors for evolving a hospital toward an electronic patient record system: a case study of two different sites. Journal of Healthcare Information Management, 12(4): 29-38.

415. Protti D. (2012) A proposal to use a balanced scorecard to evaluate information for health: an information strategy for the modern NHS (1998 - 2005). Computers in Biology and Medicine 32(3):221-236.

416. Patel VL, Kushniruk AW. (2012) The patient clinical information system (PatCIS): technical solutions for and experience with giving patients access to their electronic medical records. Intentational Journal Medical Informatics: IJMA 2002;68(1-3):113-27.

417. P'Donnell, C., Ryan, S., & McNicholas, W. T. (2020). The Impact of Telehealth on the Organization of the Health System and Integrated Care. *Sleep medical clinics*, 15(3), 431-440.

418. Pal, A., Nadiger, V., Goswami, D. & Martinez, R. (2020). Conformal, waterproof electronic decals for wireless monitoring of sweat and vaginal pH at the point-of-care. *Biosensors and Bioelectronics*, 160. https://doi.org/10.1016/j.bios.2020.112206

419. Pasipanodya, E. C. & Shem, K. (2020). Provision of care through telemedicine during a natural disaster: a case study. *Spinal Cord Series and Cases,* 6(1), 1-5. https://doi.org/10.1038/s41394-020-0309-2

420. Pecina, J. L., Vickers, K. S., Finnie, D. M., Hathaway, J. C., Takahashi, P. Y., & Hanson, G. J. (2012). Health care providers style may impact acceptance of Telemonitoring. *Home Health Care Management & Practice*, *24*(6), 276-282.

421. P. Yu, D. Hailey, H.C. Li, Caregivers' acceptance of electronic documentation in nursing homes, J. Telemed. Telecare 14 (5) (2008) 261-265.

422. P. Yu, H. Li, M.-P. Gagnon, Health IT acceptance factors in long-term care facilities: A cross-sectional survey, Int. J. Med. Inform. 78 (4) (2009) 219-229.

423. Peretti A., Amenta F., Tayebati S.K., Nittari G., Mahdi S.S. (2017) Telerehabilitation: Review of the State-of-the-Art and Areas of Application. *JMIR Rehabil Assist Technol*, 4(2): e7, doi: 10.2196/rehab.7511

424. Hilty D.M., Ferrer D.C., Parish M.B., Johnston B., Callahan E.J., and Yellowlees P.M. (2013) The Effectiveness of Telemental Health: A 2013 Review. *Telemedicine and e-Health*, (19): 6 doi:10.1089/tmj.2013.0075

425. Gentry M.T., Lapid M.I., Rummans T.A. (2019) Geriatric Telepsychiatry: Systematic Review and Policy Considerations. *The American Journal of Geriatric Psychiatry* (27): 2, 109-127 doi:10.1016/j.jagp.2018.10.009

426. Piau A., Nourhashemi F., De Mauléon A., et al. (2018) Telemedicine for the management of neuropsychiatric symptoms in long-term care facilities: the DETECT study, methods of a cluster randomised controlled trial to assess feasibility. *BMJ*, 8(6): e020982. doi: 10.1136/bmjopen-2017-020982

R

427. Rahm, D. (2019). The role of information technology in building public administration theory. Knowledge, Tecnology and policy 12 (1), 74-83.

428. Ralston JD, Revere D, Robins LS, Goldberg HI.(2014) - Patients' experience with a diabetes support programme based on an interactive electronic medical record: qualitative study. Brit Med J 2004;328(7449):1159.

429. Read, D. Marsh, D. (2012) Theory and Methods in Political Science, Political Analysis. Palgrave Macmillan. Rick C. (1997) The Relationship Between Program Developers and Delivery of Occupational Assistance. Employee Assistance Quarterly Volume 13, Issue 2, 1997.

430. Raabe-Stuppnig, K., Söllner, D., 2020. Gibt es in Österreich einen genaueren gesetzlichen Regelungsbedarf der Telemedizin? [WWW Document]. Wirtschaftsanwaelte.at. URL https://www.wirtschaftsanwaelte.at/gibt-es-in-oesterreich-einen-genaueren-gesetzlichen-regelungsbedarf-der-telemedizin/ (accessed 3.22.21).

431. Rappold, E., Juraszovich, B., 2019. Pflegepersonal-Bedarfsprognose für Österreich. Bundesministerium für Arbeit, Soziales, Gesundheit und Konsumentenschutz, Wien.

432. Republik Österreich, 2020. Änderung des Gesundheitstelematikgesetzes 2012, BGBLA Nr. 115/2020.

433. Republik Österreich, 2016. Bundesgesetz, mit dem das Gesundheits- und Krankenpflegegesetz, das Allgemeine Sozialversicherungsgesetz, das Berufsreifeprüfungsgesetz und das Ärztegesetz 1998 geändert werden (GuKG-Novelle 2016), GuKG-Novelle 2016.

434. Rapporti dell'Istituto Superiore di Sanità COVID-19 n.12/2020 "Indicazioni ad interim per servizi assistenziali di telemedicina durante l'emergenza sanitaria COVID-19.

435. Regolamento (UE) 2017/745 del Parlamento europeo e del Consiglio, del 5 aprile 2017, relativo ai dispositivi medici, che modifica la direttiva 2001/83/CE, il regolamento (CE) n. 178/2002 e il regolamento (CE) n. 1223/2009 e che abroga le direttive 90/385/CEE e 93/42/CEE del Consiglio (Testo rilevante ai fini del SEE.)

436. Republik Österreich, 1998. Ärztegesetz 1998 – ÄrzteG 1998 und Änderung des Ausbildungsvorbehaltsgesetzes, BGBl. I Nr. 169/1998.

437. Reh, G., Korenda, L., & Cruse, B. C. (2016). Will patients and caregivers embrace technology-enabled health care?: Findings from the deloitte 2016 survey of U.S. Health care consumers: *Deloitte University Press and Deloitte Center for health solutions* (Accessed at:) https://dupress.deloitte.com/dup-us-en/focus/internet-of-things/digitized-care-use-of-technology-in-health-care.html.

438. Rieder, A., 2020. Telemedizin –Corona als Wendepunkt, Zeitschrift für Gesundheitspolitik. Linzer Institut für Gesundheitssystemforschung.

439. Reading, MA, AddisonWesley. Øvretveit, J. (2012) Action evaluation of health programmes and change: a handbook for a user-focused approach.

440. Rigby, M. (2011) Evaluation 16 powerful reasons why not to do it—and 6 overriding imperatives, in: V. Patel, R. Rogers, Healthcare: current issues and future trends. Journal of Electronic Healthcare Volume 1, Number 2 : 149 – 164.

441. Rivkfin, S. (2019) Opportunities and challenges of electronic physician prescribing technology. Medical Interface; 10(8):77-83.

442. Ridley, T. (2016) Infrastructure, innovation and development. International Journal of Technology and Globalisation. Issue: Volume 2, Number 3-4 / 2006 Pages: 268 – 278. 282

443. Rindfleisch, T. (2019) Privacy, information technology, and health care. Communications of the ACM. Volume 40 Issue 8, Aug. 1997.

444. Ritchie, J., Lewis. J. (2013) Qualitative Research Practice: A Guide for Social. Science Students and Researchers. Sage Publications, London

445. Robson, K. (2012) Accounting numbers as “inscription”: action at a distance and the development of accounting. Acc. Organ. Society 17 (1992), pp. 685–708.

446. Robson, C., (2012) Real World Research, 2nd ed. Blackwell. Rogers, E. M. (1962). Diffusion of Innovations. Glencoe: Free Press

447. Rogers, E.M., (2019) Diffusion of Innovations. 3rd ed. The Free Press, New York. Rogers, E.M., (1995) Diffusion of Innovations. 4th ed. The Free Press, New York.

448. Rogers, E.M. (2013). Diffusion of innovations - Fifth Edition. New York, NY, Free Press.

449. Rohner, R.P. (2019) Advantages of the comparative method of anthropology. Behavior Science Research 1977, 12: 117-144.

450. Ronaghan. S.A, (2011), United (2001) Benchmarking E-government: A Global Perspective - Assessing the Progress of the UN Member States. United Nations Division for Public Economics and Public Administration (UNDPEPA) and American Society for Public Administration (ASPA).

451. Rose, N., Miller P. (2011) Political Power beyond the State: Problematics of Government. The British Journal of Sociology Vol. 43, No. 2 (Jun., 1992), pp. 173-205.

452. Reyes, I.; Nazeran, H.; Franco, M.; Haltiwanger, E. Wireless photoplethysmographic device for heart rate variability signal acquisition and analysis. In Proceedings of the 2012 Annual International Conferenceof the IEEE Engineering in Medicine and Biology Society, SanDiego, CA, USA, 28 August–1 September 2012; pp. 2092–2095.

453. Rotariu, C.; Manta, V.Wireless system for remote monitoring of oxygen saturation and heart rate. In Proceedings of the 2012 Federated Conference on Computer Science and Information Systems (FedCSIS), Wroclaw, Poland, 9–12 September 2012; pp. 193–196.

454. R. Oroviogoicoechea, B. Elliott, R. Watson, Review: evaluating information systems in nursing, J. Clin. Nurs. 17 (5) (2018) 567-575.

455. R. Martin, C. Hinds, M. Felix, Documentation practices of nurses in long-term care, J. Clin. Nurs. 8 (4) (1999) 345-352.

456. R. Daskein, W. Moyle, D. Creedy, Aged-care nurses' knowledge of nursing documentation: an Australian perspective, J. Clin. Nurs. 18 (14) (2009) 2087-2095.

457. R. Cheevakasemsook, Y. Chapman, K. Francis, C. Davies, The study of nursing documentation complexities, Int. J. Nurs. Pract.12 (6) (2006) 366-374.

S

458. Saarinen K, Aho M. (2015) Does the implementation of a clinical information system decrease the time intensive care nurses spend on documentation of care? Acta Anaesthesiol Scand 2005;49(1):62-5.

459. Sapci, A. H., & Sapci, H. A. (2019). Innovative assisted living tools, remote monitoring technologies, artificial intelligence-driven solutions, and robotic systems for aging societies: systematic review. *JMIR Aging*, 2(2), Article e15429. doi:10.2196/15429

460. Sang, S., Lee J.-D. (2019) A Conceptual Model of e-Government Acceptance in Public Sector. 2009 Third International Conference on Digital Society. February 01-February 07

461. Scott, W. R. (2011) The adolescence of institutional theory. Administrative Science Quarterly. 32: 493-511. 283 Scott,

462. S.G,, Bruce, R.A. (2019) Determinants of innovative behavior: a path model of individual innovation in the workplace", Academy of Management Journal. Vol. 37 pp.580-607.

463. Shachak, A, Reis, S. (2019) The impact of electronic medical records on patientdoctor communication during consultation: a narrative literature review. J Eval Clin Pract 15: 641–649.

464. Shaffin R.A., Stebbins, A. (2018) Experiencing Fieldwork: An inside view of Qualitative Research. NY:Sage.

465. Schaper, L.K. Pervan, G.P. (2017). An investigation of factors affecting technology acceptance and use decisions. Proceedings of the 40th Hawaii International Conference on System Sciences – 2007.

466. Schneider, E.C. Eisenberg, J.M. (2019) Strategies and methods for aligning current and best medical practices. The role of information technologies. Institute for Health Care Research and Policy, Georgetown University, Washington, DC, USA. West J Med. 1998 May; 168(5): 311–318.

467. Schelin, S.H. (2013) E-Government an Overview- Chapter VI (120-134). Public information technology: policy and management issues Di G. David Garson. Idea Group publishing.

468. Schreyögg J, Stargardt T, Velasco-Garrido M, Busse R (2015) Defining the benefit basket in nine European countries: Evidence from the EU-HealthBASKET project. European Journal of Health Economics 6(Suppl 1): 2-10.

469. Schumpeter, J.A. (2011) Business Cycles. New York: McGraw-Hill Book Company) Vol. 1.

470. Scott, R.E. (2013) Policy: Friend or Foe to Global e-Health, presented at Global e-Health Research and Training Program. University of Calgary Institutional Repository.

471. Shekelle, P.G., Goldzweig, C.L. (2019) Costs and benefits of health technology information: an updated systematic review.

472. Shojania KG, Girard NJ. (2019) Do unexpected deaths indicate a patient safety problem? AORN J. 2009 May;89(5):956, 838.

473. Shortell, S.M. (2013) The Emergence of Qualitative Methods in Health ServicesResearch, Health Services Research 34 (5, part 2): 1083–90.

474. Simon, S. R., Kaushal, R. et al. (2017) Correlates of electronic health record adoption in office practices: a statewide survey. Journal Administration Medical Information Association 14: 110-117. 284

475. Singleton P.; Pagliari C.; Detmer Don E (2018) Critical issues for electronic health records: considerations from an expert workshop. London : Nuffield Trust, ©2008.

476. Silverman, D. (2010) Doing Qualitative Research: A Practical Handbook. London: Sage

477. Slappendel, C. (2019) Perspectives on innovation in organizations. Organization Studies, Vol. 17 No.1, pp.107-29.

478. Shishehgar M., Kerr D., Blake J. (2019) The effectiveness of various robotic technologies in assisting older adults. *Health Informatics Journal*, 25(3) 892-918 doi: 10.1177/1460458217729729

479. Shishehgar M., Kerr D., Blake J. (2018) A systematic review of research into how robotic technology can help older people. Smart Health, (7-8): 1-18 doi:10.1016/j.smhl.2018.03.002
480. Stefanopoulou E., Lewis D., Taylor M., Broscombe J., Ahmad J., Larkin J. (2018) Are Digitally Delivered Psychological Interventions for Depression the Way Forward? A Review. *Psychiatr Q*, 89:779–794 doi:10.1007/s11126-018-9576-5

481. SGK, Sosyal Güvenlik Kapsamı, Accessed: 15/05/2016, www.sgk.gov.tr. SHCEK (2006), Yaşlılığa Genel Bakış Ankara, Accessed: 12/05/2016, [http: //www.shcek.gov.tr/hizmetler/yasli/ Yasliliga_Genel_Bakis.asp].

482. SPO-State Planning Organization (2007), "The Situation of Elderly People in Turkey and National Plan of Action on Ageing", Ankara.

483. Smith, R. (2019) What clinical information do doctors need? BMJ, 313: 1062- 1075.

484. Smith, A. (2016), Barriers to accepting e-prescribing in the USA. International Journal of Health Care Quality Assurance, Vol. 19 No. 2, pp. 158-180

485. Smith, R.H. (2016) An Empirical Examination of the Importance of Defining the PHR for Research and for Practice. Robert H. Smith School of Business Research Paper Series

486. Sofaer, S. (2001) Qualitative research methods, International Journal for Quality in Health Care,. Soonhee K., Hyangsoo L.(2006) The impact of organizational context and information technology on employee knowledge–sharing capabilities. Public Administration Review.

487. Sauermann, S., 2018. Rahmenrichtlinie für die IT-Infrastruktur bei der Anwendung von Telemonitoring Messdatenerfassung. Bundesministerium für Arbeit, Soziales, Gesundheit und Konsumentenschutz, Wien.

488. Seerainer, C., Sabutsch, S.W., 2016. eHealth Terminology Management in Austria, in: Hoerbst, A., Hackl, W.O., Keizer, N. de (Eds.), Exploring Complexity in Health: An Interdisciplinary Systems Approach. IOS Press, Amsterdam, pp. 426–430.

489. Seh, A.H., Zarour, M., Alenezi, M., Sarkar, A.K., Agrawal, A., Kumar, R., Ahmad Khan, R., 2020. Healthcare Data Breaches: Insights and Implications. Healthcare 8. https://doi.org/10.3390/healthcare8020133

490. Sozialministerium, 2019. Telemedizin [WWW Document]. URL https://www.sozialministerium.at/Themen/Gesundheit/eHealth/Telemedizin.html (accessed 3.17.21).

491. Springer Vienna, 2020. Neue Rollen und neue Aufgaben für die Pflege. ProCare 25, 8–8. https://doi.org/10.1007/s00735-020-1237-x

492. Statistik Austria, 2021. Population by age and sex [WWW Document]. www.statistik.at. URL http://www.statistik.at/web_en/statistics/PeopleSociety/population/population_change_by_demographic_characteristics/population_by_age_and_sex/index.html#:~:text=Current%20annual%20results&text=Some%205.487%20million%20inhabitants%20(61.6,19.0%25%20of%20the%20total%20population. (accessed 3.19.21).

493. Statistik Austria, 2020a. Population forecast 2020: from 2021, more elderly people than children and teenagers [WWW Document]. statistik.at. URL http://www.statistik.at/web_en/press/124764.html (accessed 3.25.21).

494. Statistik Austria, 2020b. Betreuungs- und Pflegedienste [WWW Document]. URL http://www.statistik.at/web_de/statistiken/menschen_und_gesellschaft/soziales/sozialleistungen_auf_landesebene/betreuungs_und_pflegedienste/index.html (accessed 3.19.21).

495. Steccolini, I., Caccia, L. (2012) Accounting and Organisational Change in Italian Local Governments: what's beyond managerial fashion?

496. Steccolini, I., Nasi, G. (2018) Implementation of Accounting Reforms: An Empirical Investigation into Italian Local Governments. Public Management Review, Vol. 10, No. 2, 173-94, 2008.

497. Stefanou, C.J. (2011) A Framework for the Ex-ante Evaluation of ERP Software. European Journal of Information Systems, 10 (4), 595-621.

498. Stevens J. M. and McGowan R. P. (2019) Information systems and public management. New York, NY, CBS Educational and Professional Publishing

499. Stewart, D., Walker, S. (2020) Information technology adoption in health care: when organisations and technology collide. Australian Health Review, CSIRO.

500. Stowers, G.N.L. (2013) Cyberactive: State and local governments on the World Wide Web Government Information. Quarterly Volume 16, Issue 2, 1999, Pages 111-127

501. Strauss, A.L. (2014). Qualitative Analysis for Social Scientists. Cambridge: Cambridge University Press. 285

502. Suchman LA. (2015) Plans and situated actions: The problem of human-machine interaction. Cambridge:Cambridge University Press.

503. Swan, J.A., Newell, S., (2005) The role of professional associations in technology diffusion. Organ. Stud. 16 (5), 847.

504. S. Shea, R. S. Weinstock, J. A. Teresi et al., “A randomized trial comparing telemedicine case management with usual care in older, ethnically diverse, medically underserved patients with diabetes mellitus: 5 year results of the IDEATel study,” Journal of the American Medical Informatics Association, vol. 16, no. 4, pp. 446–456, 2009.

505. S. Karjalainen, K. Korhonen, M. Viigimaa, K. Port, and Kantola, “Experiences of telemedicine-aided hypertension control in the follow-up of Finnish hypertensive patients,” Telemedicine Journal and e-Health, vol. 15, no. 8, pp. 764–769, 2009.

506. . Sevean, S. Dampier, M. Spadoni, S. Strickland, and S. Pilatzke, “Patients and families experiences with video telehealth in rural/remote communities in Northern Canada,” Journal of Clinical Nursing, vol. 18, no. 18, pp. 2573–2579, 2009.

507. Shamsabadi, A., Delbari, A., Sadr, A. S., Mehraeen, E., Mohammadzadeh, N., & Niakan Kalhori, S. R. (2019). Questionnaire development and validation for designing a health telemonitoring system for frail elderly people. *DIGITAL HEALTH*. https://doi.org/10.1177/2055207619838940

508. Sixsmith, A., Hine, N., Neild, I., Clarke, N., Brown, S. & Garner, P. (2007). Monitoring the Well-being of Older People. *Topics in Geriatric Rehabilitation*, 23(1), 9-23

509. Stip, E. & Rialle, V. (2005). Environmental cognitive remediation in schizophrenia: ethical implications of "smart home" technology. *Canadian journal of psychiatry*. Revue canadienne de psychiatrie, 50(5), 281–291. https://doi.org/10.1177/070674370505000509

510. Sundgren, S., Stolt, M., & Suhonen, R. (2020). Ethical issues related to the use of gerontechnology in older people care: A scoping review. *Nursing Ethics*, *27*(1), 88-103.

511. Salles N., Baudon M.P., Caubet C., et al. (2013) Telemedecine consultations for the elderly with chronic wounds, especially pressure sores. *Eur Telemed Res*, 2:93–100

512. **Shishehgar M., Kerr D. and Blake J. (2019) The effectiveness of various robotic technologies in assisting older adults.** *Health Informatics Journal*, 25(3) 892–918, doi:10.1177/1460458217729729

T

513. Thaulow, E.; Eriksson, J.E. How important is heart rate? J. Hypertens. 1991, 9 (Suppl. 7), S17–S23.

514.Turan Kavradim, S., Özer, Z., & Boz, İ. (2020). Effectiveness of telehealth interventions as a part of secondary prevention in coronary artery disease: a systematic review and meta-analysis. *Scandinavian Journal of Caring Sciences*, *34*(3), 585-603.

515. Thatcher, Margaret. The Path to Power. London: HarperCollins, 1995 Tatnall, A., Gilding, A. (1999) Actor-Network Theory and Information Systems Research. Proc. 10th Australian Conference on Information Systems.

516. Tan S. S., Rutten F. F. H,. Van Ineveld B. M, Redekop W. K, .and Hakkaart-Van Roijen L. (2009) Comparing methodologies for the cost estimation of hospital services. The European Journal Of Health Economics. Volume 10, Number 1, 39- 45.

517. Tan, Joseph, 2005, E-Health Care Information Systems: An Introduction for Students and Professionals, Jossey-Bass, USA.

518. T.C. Çalışma ve Sosyal Güvenlik Bakanlığı, Sosyal Güvenlik Kurumu, www.sgk.gov.tr/wps/wcm/connect/6bcc4d2870314d04963ea500ad6a0ea/ MedulaSistemi.ppt?MOD=AJPERES, (26.12.2016).

519. T.C. Sağlık Bakanlığı, 2005, Aile Hekimliği Uygulamasına Başlarken Yapılması Gereken Hazırlıklar, Ankara.

520. T.C. Sağlık Bakanlığı, 2013, Sağlık Bilgi Sistemleri Genel Müdürlüğü 2013/14 Sayılı Genelge, Ankara. T.C. Sağlık Bakanlığı, (24.12.2016). www.e-saglik.gov.tr/ERadyoloji.aspx www.saglik.net.saglik.gov.tr, (22.12.2016).

521. T.C. Sağlık Bakanlığı, its.portal.saglik.gov.tr/index.php?run=content&get=14&mp=3,10, (24.12.2016).

522. T.C. Sağlık Bakanlığı, enabiz.gov.tr/Yardim.html/#url13, (24.12.2016). www.e-saglik.gov.tr/belge/1-33811/sagliknet-hakkında.html

523. Taşçı, F. (2012), "Türkiye'de Yaşlılara Yönelik Sosyal Yardım Algısı Üzerine Değerlendirmeler", Kuşaklararası Dayanışma ve Aktif Yaşlanma Sempozyumu, Ankara.

524. The 10th Development Plan 2014-2018 (2014), Ankara, Accessed:13/5/2016, [http://www.mod.gov.tr/Lists/RecentPublications/Attachments/75/The%20 Tenth%20Development %20Plan%20 (2014-2018).pdf].

525. TurkStat (2016a), Results of Population Censuses, 1935-2000 and Results of Address Based Population Registration System, 2007-2015,Accessed:08/05/2016, [http: //www.tuik.gov.tr/ PreIstatistikTablo.do?istab_id=1588].

526. TurkStat (2006), Aile Yapısı Araştırması, Ankara.

527. TurkStat (2016b), Population Projections, 2013-2075, Accessed:07/05/2016, [h t t p : / / w w w. t u r k s t a t . g o v. t r / PreHaberBultenleri.do?id=15844].

528. TYDYUEP- Türkiye'de Yaşlıların Durumu ve Yaşlanma Ulusal Eylem Planı Uygulama Programı (2013), TC Aile ve Sosyal Politikalar Bakanlığı, Engelli ve Yaşlı Hizmetleri Genel Müdürlüğü, Ankara.

529. . Tarrow, S. (2019) Power in Movement: Social Movements, Collective Action and Politics. New York: Cambridge University Press 1995.

530. Task Force Lehre, 2019. , White Paper Lehre. Medical University of Vienna, Vienna.

531. Thiel, R., Deimel, L., Schmidtmann, D., Piesche, K., Hüsing, T., Rennoch, J., Stroetmann, V., Stroetmann, K., 2018. #SmartHealthSystems. Digitalisierungsstrategien im internationalen Vergleich. Bertelsmann Stiftung, Gütersloh.

532. Treml, A., Schwabl, B., 2020. Telemedizin in der Corona-Krise und danach [WWW Document]. Wien. Ztg. Online. URL https://www.wienerzeitung.at/themen/recht/recht/2059077-Telemedizin-in-der-Corona-Krise-und-danach.html (accessed 3.22.21).

533. Teijlingen, E. and Hundley, V., (2011) The Importance of Pilot Studies. Social Research Update (35), pp. 1-4 Teo, M. et al. (2008) Style Investing and Institutional Investors. Journal of Financial and Quantitative Analysis (2008), 43: 883-906

534. Thompson D, Johnston P, Spurr C (2019) The impact of electronic medical records on nursing efficiency. J Nurs Adm 39: 444–451.

535. Thornton, D. (2019). A Look at Agency Theory for the Novice. CA Magazine, Nov. p:90-97.

536. Tidd, J., Bessant, J., Pavitt, K. (2015) Managing Innovation: integrating technological, Market and Organizational Change, 3rd Edition, Chirchester: Wiley.

537. The Family Medicine Model of Turkey [cited November 11, 2013]. Available from: http://www. ailehekimligi.gov.tr/

538. The Centralized Hospital Appointment System (CHAS) [cited November 11, 2013]. Available from (in Turkish): http://www.hastanerandevu.gov. tr/Vatandas/hakkimizda.jsp

539. The National Health Data Dictionary (NHDD) of Turkey v2.0 [cited November 11, 2013]. Available from: http://www.e-saglik.gov.tr/dosyalar/USVS2_30032012.pdf

540. The Citizen Portal of the Centralized Hospital Appointment System [cited November 11, 2013]. Available from: http://www.mhrs.gov.tr/Vatandas/

541. The Web interface of the e-prescription system for health professionals [cited November 11, 2013]. Available from: https://medeczane.sgk.gov.tr/doktor

542. The epSOS Project: Smart Open Services for European Patients [cited November 11, 2013]. Available from: http://www.epsos.eu

543. The EMPOWER Project: Support of Patient Empowerment by an intelligent self-management pathway for patients [cited November 11, 2013]. Available from: http://www.empower-fp7.eu

544. The PALANTE Project: PAtient Leading and mANaging their healThcare through Ehealth [cited November 11, 2013]. Available from: http://www. palante-project.eu

545. The Anatomical Therapeutic Chemical (ATC) Classification System, WHO Collaborating Centre for Drug Statistics Methodology [cited November 11, 2013]. Available from: http://www.whocc.no/atc/

546. Thurmond, V.A. (2011), The Point of Triangulation. Journal of Nursing Scholarship 2011 Volume 33, Issue 3, pages 253–258.

547. Tornatzky, L.G., Fleischer, M. (2011) The Process of Technological Innovation, Lexington Books 1990.

548. T. Burns, D.A. Perkins, K. Larsen, A. Dalley, The introduction of electronic medication charts and prescribing in aged care facilities: An evaluation, Australas. J. Ageing. 26 (3) (2007) 131-134.

549. T.N. Munyisia, P. Yu, D. Hailey, The impact of an electronic nursing documentation system on efficiency of documentation by caregivers in a residential aged care facility, J. Clin. Nurs. 67 (9) (2012). 1908-1917.

550. T.S. Sockolow, K.H. Bowles, H.P. Lehmann, P.A. Abbott, J.P. Weiner, Community-based, interdisciplinary geriatric care team satisfaction with an electronic health record: A multimethod study, CIN. 30 (6) (2012) 300-311.

551. T. Berg, Patient care information systems and health care work: a sociotechnical approach, Int. J. Med. Inform. 55 (2) (1999) 87-101.

552. T. Munyisia, P. Yu, D. Hailey, Does the introduction of an electronic nursing documentation system in a nursing home reduce time on documentation for the nursing staff? Int. J. Med. Inform. 80 (2011) 782- 792.

553. T.N. Munyisia, P. Yu, D. Hailey, The impact of an electronic nursing documentation system on efficiency of documentation by caregivers in a residential aged care facility, J. Clin. Nurs. 21 (2012) 2940–2948.

554. T.H. Delone E.R. McLean, The DeLone and McLean model of information systems success: A ten-year update, J. Manage. Inf. Syst. 19 (4) (2003) 9-30.

555. T.H. DeLone E.R. McLean, Information Systems Success: The quest for the dependent variable, Inf. Syst. Res. 3 (1) (1992) 60-95.

556. T.-Y. Jen C.-C. Chao, Measuring mobile patient safety information system success: An empirical study, Int. J. Med. Inform. 77 (10) (2008) 689-697.

557. T.G. Glaser A.L. Strauss, (Eds.), The Discovery of grounded theory: strategies for qualitative research, Aldine-Atherton, Chicago, 1967.

558. T. Martin, (Eds.), Who cares for older Australians? A picture of the residential and community based aged care workforce, 2007, Commonwealth of Australia, Barton, A.C.T., 2008.

559. TJ. Talmon, E. Ammenwerth, J. Brender, N. de Keizer, P. Nykanen, M. Rigby, STARE-HI - Statement on reporting of evaluation studies in Health Informatics, Int. J. Med. Inform. 78 (1) (2009) 1-9.

560. T.T, AIHW, Australia's health 2010. Australia's health no. 12. Cat. no. AUS 122. AIHW, Canberra, 2010.

561. T.R, Access Economics, Caring places: planning for aged care and dementia 2010-2050. Access Economics Pty Limited., 2010.

U

562. United Nations (2017). *Probabilistic projection of total population (both sexes combined) by region, subregion, country or area, 2015-2100 (thousands), Median (50 percent) prediction interval, 2015 – 2100*. Retrieved from **https://esa.un.org/unpd/wpp/dvd/Files/1_Indicators%20(Standard)/EXCEL_FILES/1_Population/WPP2017_POP_F01_1_TOTAL_POPULATION_BOTH_SEXES.xlsx**

563.. U, J.S. Ash, D.F. Sittig, E.G. Poon, K. Guappone, E. Campbell, R.H. Dykstra, The extent and importance of unintended consequences related to computerized provider order entry, J. Am. Med. Inf. Assoc.14 (4) (2007) 415-423.

564. U.S. Ash, M. Berg, E. Coiera, Some unintended consequences of information technology in health care: The nature of patient care information system-related errors, J. Am. Med. Inf. Assoc. 11 (2) (2004) 104- 112.

565. U.I. Harrison, R. Koppel, S. Bar-Lev, Unintended consequences of information technologies in health care—an interactive sociotechnical analysis, J. Am. Med. Inf. Assoc.14 (5) (2007) 542-549.

566. U. Cresswell, A. Worth, A. Sheikh, Integration of a nationally procured electronic health record system into user work practices, BMC Med. Inform. Decis. Mak. 12 (1) (2012) 15.

567. United Nations Office for the Coordination of Humanitarian Affairs - OCHA (2020). *Global Humanitarian Response Plan*. Ginevra: OCHA. Testo disponibile all'indirizzo web: https://www.unocha.org/sites/unocha/files/Global-Humanitarian-Response-PlanCOVID-19.pdf

568. U., Ohannessian R., Duong T.A., Odone A. (2020) Global Telemedicine Implementation and Integration Within Health Systems to Fight the COVID-19 Pandemic: A Call to Action. *JMIR Public Health Surveill*, 6(2): e18810 doi:10.2196/18810

569. U. **Hakkennes S., Craft L., Jones M. (2020) Hype Cycle for Digital Care Delivery Including Telemedicine and Virtual Care. ID: G00441722**

W

570. Walker, C. L., Kopp, M., Binford, R. M. & Bowers, C. J. (2017). Home Telehealth Interventions for Older Adults With Diabetes. *Home Healthcare Now*, 35(4), 202-210. doi: 10.1097/NHH.0000000000000522.
571. Wang, C. J., Car, J., & Zuckerman, B. S. (2020). The Power of Telehealth Has Been Unleashed. *Pediatric Clinics*, 67(4), xvii–xviii. https://doi.org/10.1016/j.pcl.2020.05.001
572. Wildevuur, S. & Simonse, L. (2015) Information and Communication Technology–Enabled Person-Centered Care for the "Big Five" Chronic Conditions: Scoping Review. *Journal of medical Internet research*, 17(3).
573. World Health Organization (2011). *World Report on Disability*. Retrieved from https://www.who.int/gho/mortality_burden_disease/life_tables/en/
574. WHO (2016), Accessed:10/05/2016, [http://www.euro.who.int/en/healthtopics/Life-stages/healthy-ageing/healthy-ageing].

575. Williamson, K. and T. Asla (2009), "Information Behavior of People in the Fourth Age: Implications for the Conceptualization of Information Literacy", Library & Information Science Research 31, 76–83.
576.. W.O. Hackl, A. Hoerbst, E. Ammenwerth, "Why the Hell Do We Need Electronic Health Records?" EHR acceptance among physicians in private practice in Austria: A qualitative study, Methods Inf. Med. 50 (1) (2011) 53-61.

577. van Doorn-van Atten, M. N., de Groot, L. C., Romea, A. C., Schwartz, S., de Vries, J. H., & Haveman-Nies, A. (2019). Implementation of a multicomponent telemonitoring intervention to improve nutritional status of community-dwelling older adults: a process evaluation. *Public health nutrition*, 22(2), 363–374. https://doi.org/10.1017/S1368980018002185
578. VandeWeerd, C., Yalcin, A., Aden-Buie, G., Wang, Y., Roberts, M., Mahser, N., Fnu, C. & Fabiano, D. (2020). HomeSense: Design of an ambient home health and wellness monitoring platform for older adults. *Health and Technology, 10*(5), 1291-1309.
579. Vitacca, M., Comini, L., Tabaglio, E., Platto, B. & Gazzi, L. (2019). Tele-Assisted Palliative Homecare for Advanced Chronic Obstructive Pulmonary Disease: A Feasibility Study. *Journal of palliative medicine,* 22(2), 173-178. doi: 10.1089/jpm.2018.0321.

Y

580. Yanicelli, L. M., Vegetti, M., Goy, C. B., Martínez, E. C. & Herrera, M. C. (2020). SiTe iC: A telemonitoring system for heart failure patients. *International Journal of Medical Informatics,* 141, 104204. doi: 10.1016/j.ijmedinf.2020.104204.
581. Y.K. Jha, D. Doolan, D. Grandt, T. Scott, D.W. Bates, The use of health information technology in seven nations, Int. J. Med. Inform. 77 (12) (2008) 848-854.

582. Y. Gans, J. Kralewski, T. Hammons, B. Dowd, Medical groups' adoption of electronic health records and information systems, Health Aff. 32 (5) (2013) 1323-1333.

583. Y.N. Munyisia, P. Yu, D. Hailey, Does the introduction of an electronic nursing documentation system in a nursing home reduce time on documentation for the nursing staff? Int. J. Med. Inform. 80 (11) (2011) 782-792.

584. Y. Menachemi R. Brooks, Reviewing the benefits and costs of electronic health records and associated patient safety technologies, J. Med. Syst. 30 (3) (2006) 159-168.

585. Y.M. Campbell, D.F. Sittig, J.S. Ash, K.P. Guappone, R.H. Dykstra, Types of unintended consequences related to computerized provider order entry, J. Am. Med. Inf. Assoc. 13 (5) (2006) 547-556.

586. Y.S. Ash, D.F. Sittig, R.H. Dykstra, K. Guappone, J.D. Carpenter, V. Seshadri, Categorizing the unintended sociotechnical consequences of computerized provider order entry, Int. J. Med. Inform. 76, Supplement 1 (0) (2007) S21-S27.

Z

587. Zmud, R.W. (2001) Diffusion of modern software practices: Influence of centralization and formalization. Management Science, 28(12), 1421-1431.

588. Zdon, L., Middleton, B. (2002) Ambulatory Electronic Records Implementation Cost Benefit: An Enterprise Case Study. Proc Healthcare Information Management Systems Society 1999; 97-117.

589. Z.N. Munyisia, P. Yu, D. Hailey, How nursing staff spend their time on activities in a nursing home: an observational study, J. Adv. Nurs. 67 (9) (2011) 1908-1917.

590. Z..Y.-S. Jeong M. McMillan, Documentation leads to reform: reality or myth, Geriaction 21 (4) (2003) 22-25.

591. Z. Dorda, G. Duftschmid, L. Gerhold, W. Gall, J. Gambal, Introducing the electronic health record in austria, Stud. Health. Technol. Inform. 116 (2005) 119-124.

592. Z.O. Otieno, T. Hinako, A. Motohiro, K. Daisuke, N. Keiko, Measuring effectiveness of electronic medical records systems: Towards building a composite index for benchmarking hospitals, Int. J. Med. Inform. 77 (10) (2018) 657-669.

593. Zhang, P. Yu, J. Shen, The benefits of introducing electronic health records in residential aged care facilities: A multiple case study, Int. J. Med. Inform. 81 (10) (2012) 690-704.

594. Z. B. Middleton, W.E. Hammond, P.F. Brennan, G.F. Cooper, Accelerating U.S. EHR adoption: How to get there from here. Recommendations based on the 2004 ACMI retreat, J. Am. Med. Inf. Assoc. 12 (1) (2015) 13-19.

595. Zulfiqar A.A., Hajjam A., Andrès E. (2018) Focus on the Different Projects of Telemedicine Centered on the Elderly in France. *Current Aging Science*, 11, 202-215 doi: 10.2174/1874609812666190304115426

596. Zolant S.M. (2017) A theoretical model to explain the smart technology adoption behaviors of elder consumers (Elderadopt). *Journal of Aging Studies*, 42: 56-73. doi:10.1016/j.jaging.2017.07.003

597. Zhang, X., Yu, P., Yan, J., & Spil, I. T. A. (2015). Using diffusion of innovation theory to understand the factors impacting patient acceptance and use of consumer e-health innovations: A case study in a primary care clinic. *BMC Health Services Research*, 15(1), 1-15. doi:10.1186/s12913-015-0726-2