Inventive Management for Anonymous Forensic approved delivery of evidences and product samples

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Abstract—**There are three parties involving in a typical product examination through sampling procedure. The authority, the auditor and the examination Laboratory. The main idea of the invention is to isolate these three involving parts and assure anonymity for a forensically approved sampling procedure. Our solution is an intelligent parcel. The parcel creation is commanded through automated call by the authority to an auditor. He collects the investigation sample, he puts it into the intelligent parcel and locks it. Then he places it to a courier service with unknown delivery address which is revealed by the courier at the first transshipment hub. Finally, the parcel is unpacked and examined in the lab. For the initial stage the parcel records every transport detail to a giant undeniable auditing path with full anonymity. Application are sampling in restaurant food and beverages, supermarket products, organic agriculture, ecology assurance, secure filing etc.**

Keywords— anonymity, GDPR, forensics, organic food, auditing trail path, courier,

I. INTRODUCTION

The intelligent parcel is an old dream of Logistic companies and researchers [9, 19, and 20]. Various researchers propose different approaches for sampling anonymity. [17, 22]. Other they focus administration approach for anonymity. [1, 13, 21]

The project derived from Razis research [7] proposing different approach for any public procurement. A logistics company made an offer using this research results. Other companies solve the high tech logistics parcel box in a variety of solutions. [10, 14, 15]

The applied research world has been transferred in China in our times. Day by day it shifts from ultra cheap manufacturers to actual real world solutions and products. Their effort in the area is significant with hitches like:

- They publish only in their own language.

- They do use science to implement their solution; they only face the products from technology perspectives.

- They do not fulfill west world customer's needs.

- Their drawings do not comply with PCT standards

Their total effort in the area as translated from the Chinese language by WIPO and without drawings follow.

All these work has been send to us a few days ago by OBI – PCT. All similarities with our work is functional only. Even today, they do not appear in international languages, Google or Google patents and scholar.

A. DESCRIPTION CN206711259

The utility model provides a smart express box, comprising a box body, a box cover connected to the box body, and a lock device for locking the box body and the box cover together, and a background control center And a handheld device wirelessly connected to the background control center, the lock includes an electronic lock core module and a positioning module, and the handheld device is directly or indirectly communicatively coupled to the electronic lock core module. By setting the handset, the courier applies for unlocking to the background control center through the handset when delivering, and the background control center confirms whether to provide the unlock password to the handset according to the location information provided by the positioning module and the courier information provided by the handset. After receiving the unlock password, the machine sends it to the electronic lock core module, so that the courier does not have the password, the security is relatively good, and the customer does not need to keep the password, and the utility is relatively good. [6]

The solution is more close to a technical university academic exercise and not a product for the international market.

B. DESCRIPTION CN106974539

The invention discloses a smart envelope box based on the Internet of Things technology, which has a box body, a plurality of unit boxes are arranged in the box body, a camera and an alarm device are arranged on the box body, and the unit box is divided into a control box and a letter box. And a parcel box; the control box is provided with a power module, a microprocessor, a GPRS communication module, a switch output module and a switch device, and a signal recognition device is arranged on the box door of the control box; and is installed at the bottom of the letter box/package box Pressure sensor, and an electronic lock is installed between the door and the box; the microprocessor is respectively connected with the power module, the pressure sensor, the signal recognition device, the GPRS communication module, the camera and the alarm, and the switch output module and the switch device are The switch

state of the electronic lock is controlled in real time; the invention has simple structure and reasonable layout, and realizes convenient and quick storage and extraction of letters/packages by using the Internet of Things technology, thereby ensuring the safe storage of letters/packages. [3]

Our opinion is that this solution is more close to our IOT standards and could not threaten our approach due to patent roll date options.

C. DESCRIPTION CN205722203 2016.11.23

The utility model discloses an express delivery inbox based on the Internet of Things, the inbox is provided with a plurality of boxes for storing objects, and each of the boxes is provided with a box door, and each of the box doors passes through A door lock motor controls the lock, each of the door lock motors is driven by a processor unit, the processor unit is connected with an input keyboard for inputting a door opening password, and the inbox is provided with a label scanner. The tag scanner outputs a scan signal containing telephone information to the processor unit, the processor unit being coupled to the GSM communication unit and communicating with the user handset via the GSM communication unit. The express delivery inbox of the utility model is convenient to use, can store the courier pieces safely, is convenient for the courier to distribute the work, and is convenient for the user to collect the courier, and can know the courier storage information in time, and collect the courier in time. [4]

D. DESCRIPTION CN104873082 2015.09.02

The smart courier that uses the tablet as a control center involves a smart courier box. A smart courier box includes a power supply, an electronically controlled lock, multiple compartments, a door on each compartment, and a tablet. The tablet is connected to a control circuit board. The control circuit board is connected to the electronically controlled lock. The tablet has a USB interface with an OTG function. The connection mode of the tablet computer and the electronically controlled lock is connected through a USB or a headphone jack wire. The tablet is connected to a printer. The user's exit button and power button user have no permission to use, and only the touch screen is exposed for use. The electric lock is connected to a DC power source. The tablet is connected to a remote server through a communication module. The client is connected to a remote server through a communication module.

We think that the above solution is more close to our approach from mechanical point of view. However in our times only intrascience solution find the way to the market.

E. DESCRIPTION CN205751055 2016.11.30

Abstract The utility model discloses a smart home express box. The smart home express box includes a box, an intelligent controller and a scanner, the box includes a box door, and the box door is provided with a smart lock. The intelligent controller is electrically connected to the smart lock, the scanner and the user terminal, respectively, and is controlled by the user terminal to open the smart lock. According to the smart home express box of the present invention, the problem of low security of the courier pickup or the receipt in the prior art can be solved. [5]

II. ANONYMUS PARCEL

Invention technical field areas are:
• Electronics,
• logistics
• Insurance Agriculture products
• Certification organic agriculture
• Public Auditing
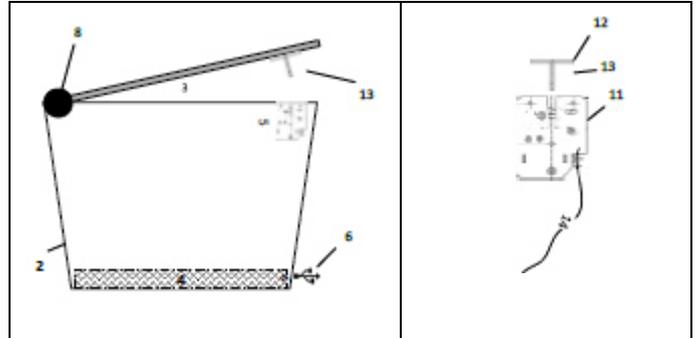

Figure 1, parcel box and electric lock

Existing technology today facilitates auditing tasks with a variety of technical solutions. Most people overestimate the efficiency of the applied procedure. Altogether the technology offers the solution to eliminate any possible malfunction. In all type of industries, a significant number of product and material investigation are attempted every day. The procedure remained simple all these years. The assignee authority sends the task to the auditor. He collects a product from a super market or a ground slice from a farm. He packs the sample and send it to an examination lab. The lab performs all the necessary tests and pontificates about the sample specifications and compliance to the governing law and send the results to the authority. This procedure arises lack of anonymity at every stage of the sampling and examination.

There are three parties involving in a typical product examination through sampling procedure:
• The authority orders the product or material examination.
• The operator takes a sample and sends it to the lab.
• The lab examines the sample and reports to the authority.

The whole procedure is done for the public benefit and it deserves efficient anonymity preserve at all stages.

The main idea of the invention is the isolation of the above three phases. If anonymity is assured at every certification stage, then we conclude to a forensically approved sampling procedure and therefore, a fair subsequent product examination.
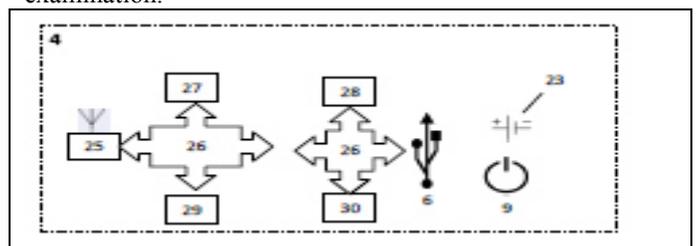
Figure 2, computer layout

Current worldwide technology faces the problem with clerical tasks, new legislation and possibly bureaucracy.
Our solution is an intelligent parcel. The parcel creation is commanded through automated call by the authority to an appropriate unknown auditor.
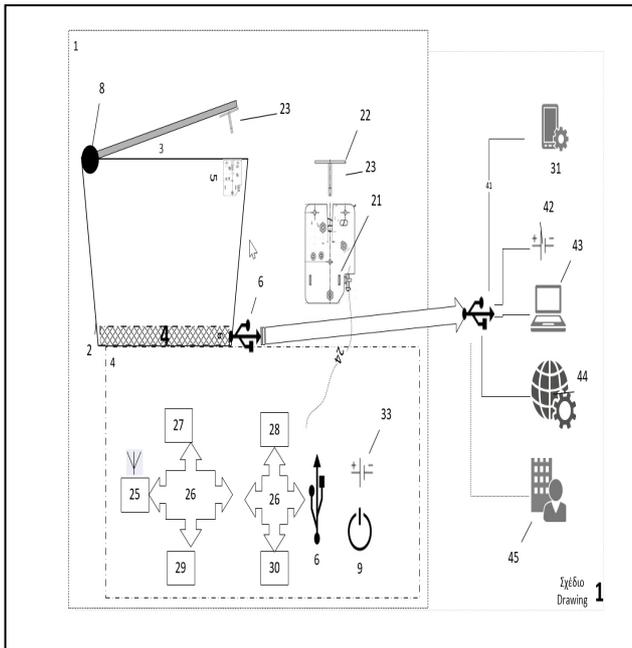
Figure 3, parcel hardware and concept functionality

He collects the investigation sample, he puts it into the intelligent parcel and locks it. Then it places it to a courier service with unknown delivery address. The delivery address is revealed by the courier operator at the first transshipment hub. Finally, the parcel is unpacked and examined in the lab. For all stages the parcel records every transport detail to a giant undeniable auditing path with full anonymity.

The invention could be used for sampling in a variety of cases like: restaurant food and beverages, supermarket products, organic agriculture, ecology assurance, secure filing and a lot of others. [12, 15, 18]

## III. INVENTION DESCRIPTION

To describe the invention, we attach 3 drawings.

Drawing 1 describes the parcel box
- The full feature intelligent parcel (1)
- The parcel container (2)
- The parcel seal cover (3)
- Hinges to insert cover (8)
- The board computer (4)
- The USB hardwired connection with the world (6)
- The electric un-lock body (21)
- Lock latch (22)
- Lock hook (23)
- Cables from lock to computer (24)
- connection to the operator computer or smartphone (31)
- external battery charger (42)
- external USB connected computer (43)
- connection to external Internet services (44)
- Final destination receiver operator (45)

Drawing 1, sub-drawing for computer (4)
- Main on-off switch (9)
- GPS receiver and logger (25)
- Parcel computer bus (26)
- Temperature and moisture logger (27)
- Wi-Fi or blue tooth antenna (28)
- GSM module (29)
- Open future module (30)
- Computer Battery (33)
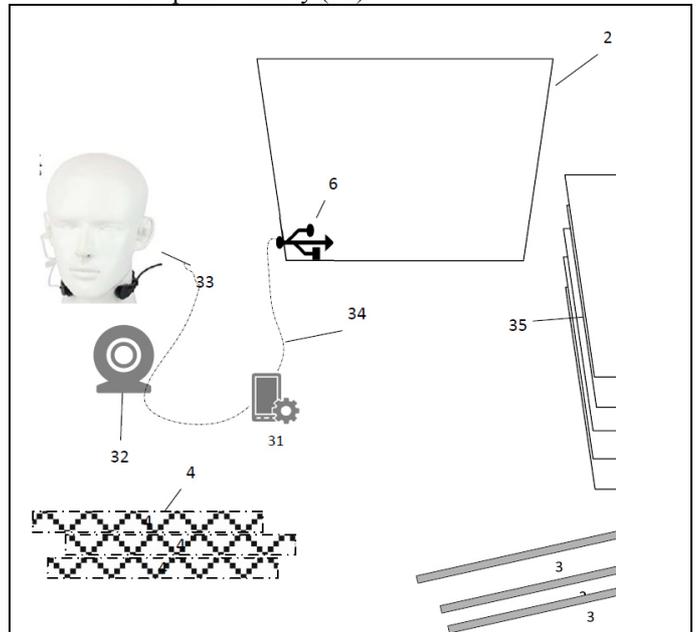
Figure 4, parcel preparation

Drawing number 2, is the operator equipment and the associated warehouse options
- The parcel container (2)
- The parcel seal cover (3)
- Lock hook (23)
- Operator computer or smartphone (31)
- Laryngophone (33)
- Simple camera (32)
- Wi-Fi (33) or Hardwired USB (34) BOX-operator connection
- The stackable boxes (35)

A. Drawing 3 describes the spatiotemporal invention usage

The drawing has the four operational steps of the invention.
Step 1, parcel warehouse
- The step number (11)
- The parcel container (2)
- The parcel seal cover (3)

- Operator computer or smartphone (31)
- Laryngophone (33) in order to preserve other people personal data.
- Simple camera (32) blurring,
- Wi-Fi (33) or Hardwired USB (34) Box-operator connection
- The stackable boxes (35)
Step 2, the actual sampling operation
- The step number (12)
- The operator (51)

- The land sampling with the shovel (52)
-
Step 3, anonymous delivery to the courier
- The step number (13)
- The irrevocably sealed parcel (2,3)
- Delivered anonymously to a courier service (54)
Step 4, final destination unpacking
- The step number (14)
- external USB connected computer (43)
- Final destination receiver operator (45)
- The electric un-lock body (21)

The intelligent parcel (1) has the following general functionalities
A normal stackable box (2) has a computer (4) and a lock (21). The computer captures all surrounding data through various sensors and communicates with the box (1) and all devices through a USB connection.

IV. LEGISLATION VIEW

The intelligent parcel (1) is characterized by a normal parcel container box (2), a seal cover (3) with an electric un-lock body (21), a onboard computer (4), and associated secure hardware and software operation tools for sender, receiver and beneficiary.

The parcel container box (2) according the above main claim is characterized by a cover (3) to be inserted into the hinges (8) and locked until the electric un-lock body (21) receives command from the computer (24) and it releases the hook (23).

The onboard computer (4) according the above main claim is characterized by a GPS receiver and logger (25), the parcel computer bus (26), Temperature and moisture logger (27), Wifi or blue tooth antenna (28), GSM module (29), an open future module (30), battery (33), unlocking signal to the electric lock body (21) and finally sending all associate data to the responsible company or authority.

The associated secure operation tools for sender according the above main claim is characterized by a laryngophone (33), operator computer or smartphone (31), Simple camera (32), Wifi (33) or Hardwired USB (34) Box-operator connection.

The associated secure operation tools for receiver according the above main claim is characterized by an external USB connected computer (43) that accepts unlocking codes from the Internet to release the lock (21).

The software operation tools for the beneficiary according to the above main claim is characterized by anonymous collection of data for every spatiotemporal step of the box (1). The exact identity of origination, audit path and results will be revealed only after lab test results.

V. CASE STUDY

A general example will clarify the use (drawing 3) in four places and time frames:
(11) = parcel boxes warehouse, time 0:00
(12) =on field sample pickup, time 1:22
(13) =on courier parcel loading area, time 2:31
(14) =on examination lab premises, time past 2 days 2:43
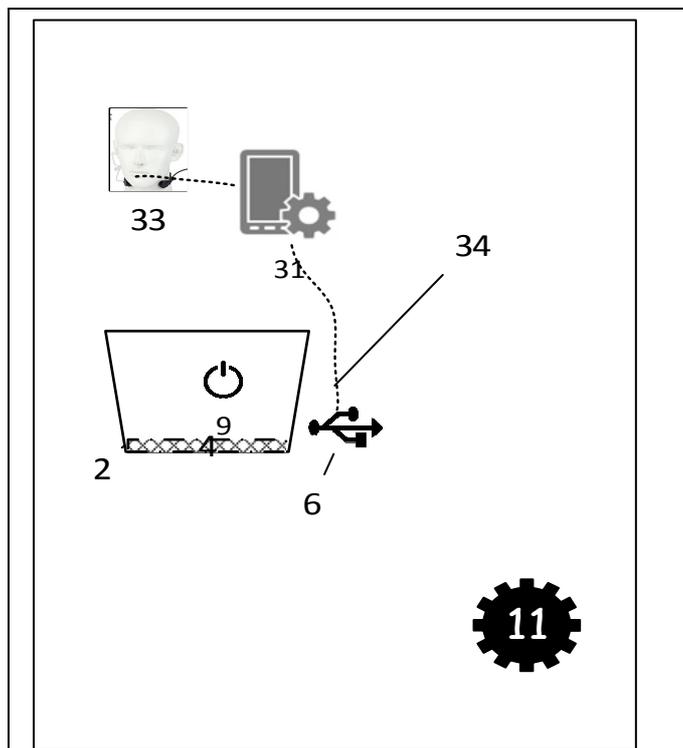

Figure 5, First step

At the first stage (11) the operator receives to his phone an assignment signal from the governing body assignee. The operator goes to the appropriate warehouse (drawing 2) and picks up the mission equipment. First he collects the box (2), the cover (3) and turns on (9) the computer (4). Then through wired (6,34) or not (33) socket He connects laryngophone (33) to his neck, a blurring camera to his shirt (32) and establish a recording session into his smartphone (31). For now, on everything is recorded in the parcel (1) and the phone (31). The operator travel to the action point.
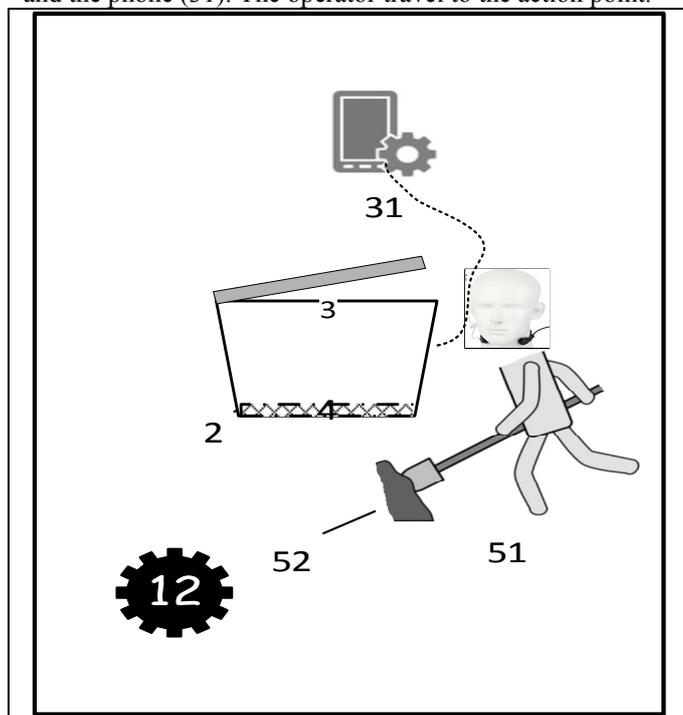

Figure 6, second step

The action to be done would be a super market product selection, a field flower or a farm sample. We reached the second stage (12) where the operator digs the ground and collects a sample. He puts it into the box and closes the cover 3. The cover is permanently locked and it needs a web code through the computer (4) to open. All mission data is recording uninterruptedly.
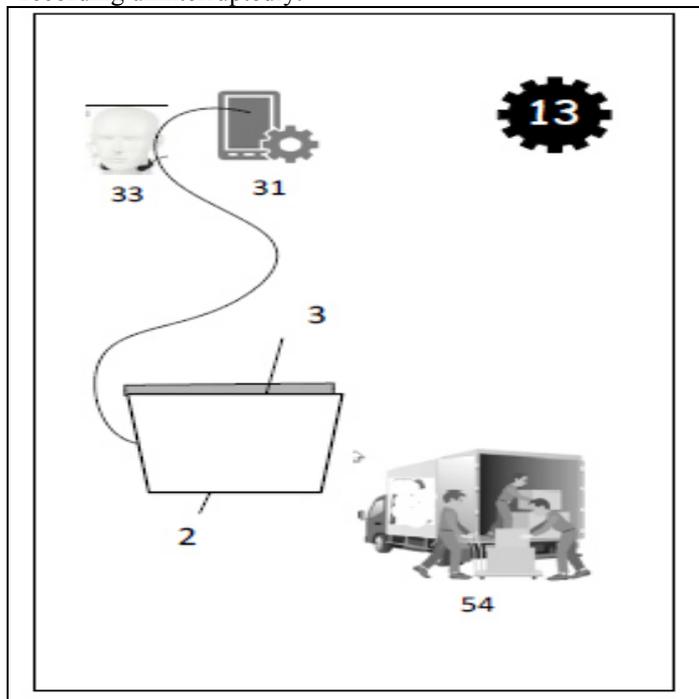
Figure 7, third loading step

During the third stage (13) the operator (51) unloads the parcel (1) to a courier service (54). The parcel is loaded to destination unknown. Simple software will reveal the destination address at a later step in the upcoming courier hub.
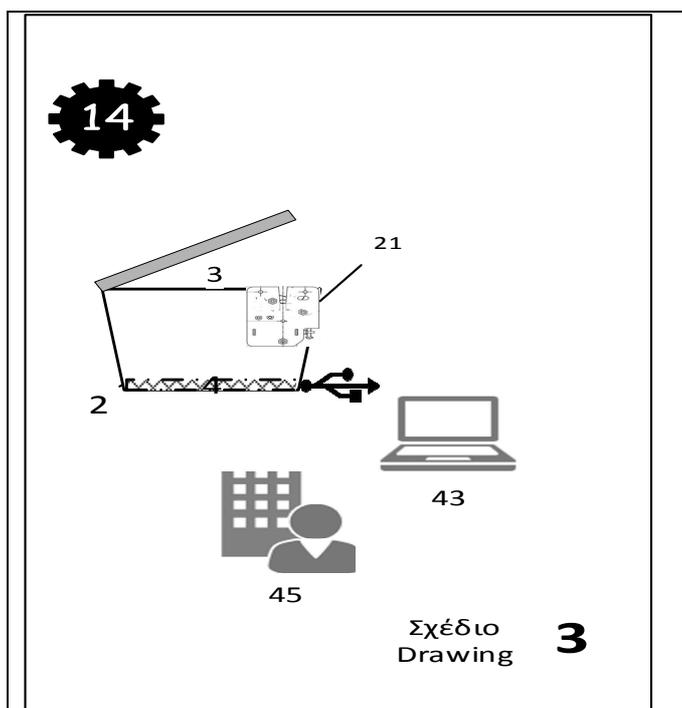
Figure 8, final on site step

In the final fourth stage the parcel reaches the examination (or final archive location) facilities. There the final destination receiver operator (45) connects the computer (43) to the parcel (1) through the socket (6). Then unload all parcel data to the Beneficiary site, it receives a code and unlocks the lock (21). He received a sample to analyze but he has no idea about anything else.

The main invention problem is the battery duration for overseas delivery. This is easily solved with a parcel box (2) with a battery with huge capacity, to be fitted inside (42) and travelling alongside and connected through socket (6).

At the engineering stage of the invention alpha test a number of parts will be replaced by more efficient subsystems. All of the electric and mechanic parts are commercially available from the industry today but there is a number of implementation details to be solved, both at a technical and cost benefit level.

VI. FUTURE IMPLEMENATION DETAILS

After the initial phase of the project a number of new reasrch ideas arised. There is a proposal for suplemeantary secure step for parcel delivery through the BlockChain technology and Smart ERC20 tokens [Kanavas]

A Dutch Company already added extra functionality:

- Internal BlockChain recording capability.
- External flashing or bursting LEDs to express box status and transport company workers attention.
- Two interconnected boxes the on only with a huge battery pack for overseas delivery.
- A special version for gold refineries and diamond anonymous one to one delivery and

REFERENCES

[1] AUERSWALD, Heike, et al. Teams in a public goods experiment with punishment. *Journal of Behavioral and Experimental Economics*, 2018, 72: 28-39.

[2] Basilios Kanavas and Athanasios Zisopoulos. Administrative Legislation for Tax Payoff by Combining Tax Payments, Land Allotment, Service Concession under Humanitarian Approach. Journal of Finance and Accounting. 2017; 5(1):6-13. doi: 10.12691/jfa-5-1-2

[3] CN106974539, State Intellectual Property Office of the People's Republic of China

[4] CN205722203, State Intellectual Property Office of the People's Republic of China, 2016.11.23

[5] CN205751055, State Intellectual Property Office of the People's Republic of China, 2016.11.30

[6] CN206711259, State Intellectual Property Office of the People's Republic of China, 2017-12-05

[7] Dimitrios Razis, Athanasios Zisopoulos, Konstantinos Pavlistas,Invention Patents and Competitive Tendering, an equilibrium model amongst European Patent Office, Trade Bureau of Competition, procurement agencies and municipalities in a Public call for offers,5th International Conference on Applied Economics,Department of Economics, University Thessaly,VOLOS Greece,17-19 May 2017,

[8] George Gerakis, Dimitrios Razis, and Athanasios Zisopoulos,NICODIMUS, a forensic device to support Avocate and Judger public function and office,2016 International Symposium on Ambient Intelligence and Embedded Systems,AmiEs 2016 Proceedings,Heraklion, Crete, Greece,22 - 24 September, 2016,

[9] GUPTA, Abhishek, et al. Towards context-aware smart mechatronics networks: Integrating swarm intelligence and ambient intelligence. In: *Issues and Challenges in Intelligent Computing Techniques (ICICT), 2014 International Conference on*. IEEE, 2014. p. 64-69.

[10] HEITZ, Adeline; BEZIAT, Adrien. The parcel industry in the spatial organization of logistics activities in the Paris Region: inherited spatial patterns and innovations in urban logistics systems. *Transportation Research Procedia*, 2016, 12: 812-8

[11] Kanavas, Vasilios George, Athanasios Dimitrios Zisopoulos, and Razis Dimitrios. "Non-Administrative Models to Deteriorate Tax Evasion, a Socio-Cybernetic Application using NLP Archives for Taxpayer Euphoria Formation." *Research in Applied Economics* 9.4 (2017): 25-40.

[12] KEITH, LawrenceH. Environmental sampling and analysis: a practical guide. Routledge, 2017.

[13] KLEIN, Esther E.; CLARK, Chalmers C.; HERSKOVITZ, Paul J. Philosophical dimensions of anonymity in group support systems: ethical implications of social psychological consequences. *Computers in Human Behavior*, 2003, 19.3: 355-382.

[14] KOPCZAK, Laura Rock. Logistics partnerships and supply chain restructuring: survey results from the US computer industry. *Production and Operations Management*, 1997, 6.3: 226-247.

[15] LEE, Chanam; MOUDON, Anne Vernez; COURBOIS, Jean-Yves Pip. Built environment and behavior: spatial sampling using parcel data. *Annals of Epidemiology*, 2006, 16.5: 387-394.

[16] LEE, Je Sun. Delivery freight deposit box and method for receiving delivery freight using the same and method for certificatting password. U.S. Patent Application No 15/308,762, 2017.

[17] MARINELLI, Mario, et al. En route truck–drone parcel delivery for optimal vehicle routing strategies. *IET Intelligent Transport Systems*, 2017, 12.4: 253-261.

[18] MARRIOTT, Norman G.; SCHILLING, M. Wes; GRAVANI, Robert B. *Principles of food sanitation*. Springer, 2018.

[19] RZEVSKI, George. On conceptual design of intelligent mechatronic systems. *Mechatronics*, 2003, 13.10: 1029-1044.

[20] SALMELA, Hannu; TOIVONEN, Sirra; SCHOLLIERS, Johan. Enhancing supply chain security with vulnerability management and new technology. *IET intelligent transport systems*, 2010, 4.4: 307-317.

[21] SCHUMANN, Sandy, et al. When is computer-mediated intergroup contact most promising? Examining the effect of out-group members' anonymity on prejudice. *Computers in human behavior*, 2017, 77: 198-210.

[22] VAKULENKO, Yulia; HELLSTRÖM, Daniel; HJORT, Klas. What's in the parcel locker? Exploring customer value in e-commerce last mile delivery. *Journal of Business Research*, 2018, 88: 421-427.

[23] VASILIOS, Kanavas; ATHANASIOS, Zisopoulos; PAPANGELOU, Stamatis. Small Forensic "Smart-Law-Scripts" the First Step for Intelligent Justice Punishment in Law Enforcement, Economic Crime and Alternative Sentences. *Business and Economic Research*, 2018, 8.2: 154-167.