Chapter 14
Flexibility in Transportation Management Strategy for Improved Efficiency: An Indian Soft Drink Industry Perspective

Kamal Karnatak and P. R. S. Sarma

14.1 Introduction

Logistic management, in any organization, helps in achieving desired level of service efficiency and quality at minimum cost. It requires planning and coordination of lot of activities. Logistic is not limited to one function but its scope spans the whole organization. Logistic helps in linking supply base to market place (Martin 2011).

Logistics plays a very important role in today's cost sensitive organizations. If we take the case of soft drink industry, especially in India, transportation of goods across various distributors plays a very important role. The logistic strategy formulation requires proper planning of logistic, its implementation, and controlling of the same. In the overall logistic planning the key area is transportation as it needs to be highly efficient with minimal cost. To make transportation efficient, optimized route determination plays a major role and with the help of technology it can facilitate better decision-making (Fang et al. 2011). The main challenge of soft drink industry is to find the optimized route for the vehicles to deliver the material to retailers. Technology can help in optimizing the routes but it requires change in the transportation strategy keeping the existing retailers, vehicles, and people in place.

With an average growth rate of 9.8% in 2007–2008, and 6.9% during 2011–2012: the years of the worst global financial crisis, India has been one of the best performers in the world economy. The growth that the country has experienced demonstrates the strength of the economy and India's growing importance in the

K. Karnatak (✉)
RJ Corp, New Delhi, India
e-mail: kkarnatak@gmail.com

P. R. S. Sarma
Indian Institute of Management Raipur, Raipur, India
e-mail: dr.pappu.sarma@gmail.com

Sushil et al. (eds.), *Managing Flexibility*, Flexible Systems Management,
DOI 10.1007/978-81-322-2380-1_14

world economy. But declining growth rate has created pressure on margins for the companies. Companies are taking projects of reducing cost to improve margins.

14.2 Review of Literature

14.2.1 Flexible Management Systems and Flowing Stream Strategy (FSS)

Flexibility has many meanings depending upon the situation. Sushil (2000) mentions adaptiveness to the changes in the environment, adjustment to situation, amiability in relationships, etc. In an organization there are multiple types of flexibilities like organizational flexibility, strategic flexibility, supply chain flexibility, operational flexibility, information system flexibility, manufacturing flexibility, etc. Sushil further elaborates that "flexibility is the exercise of free will or freedom of choice on the continuum to synthesize the dynamic interplay of thesis and antithesis in an interactive manner, capturing the ambiguity in systems and expanding the continuum with minimum time and efforts." If flexibility is seen from systematic point of view then it has major attributes viz., spectrum, integration, interaction, innovation, and fuzziness (Saxena et al. 2006).

Flexibility is one of the most talked subjects in today's world in the context of an organization. In this section we would review the flexibility concept and would lead to FSS as suggested by Sushil (Sushil 2012a, b). Flexibility is also defined as "the ability to change or react with little penalty in time, effort, cost, and performance" Upton (1994). Bahrami (1992) defines flexibility as "a multidimensional concept demanding agility and versatility, associated with change, innovation, and novelty, coupled with robustness and resilience, implying stability, sustainable advantage, and capabilities that may evolve over time."

All these definitions suggest that flexibility is something which is desired in positive context. Sushil (2000) mentions that flexibility is multidimensional in nature and he uses concept of paradoxes to elaborate his point. He mentions that organization deals with the dilemma of thesis and antithesis in various contexts like continuity–change, centralization–decentralization, and stability–dynamism and so on. If organization moves from one polar opposite to other it does not bring in flexibility, on the contrary system may lose its identity. So in an organization both opposites exist at the same time and they change their degree over time as per the requirement.

In July 2011, a survey was conducted by PRTM (PRTM is a management consulting subsidiary of PwC.) and results suggest that those organizations who have implemented five supply chain flexibility levers could reduce its supply chain costs by 8–10% and achieved a 12–15% revenue increase (Reinhard et al. 2011).

Change in any organization is a necessity but it could be channelized only if there is a continuity. Sushil (2005) has used a metaphor of flowing stream to define the continuity and changes simultaneously. A flowing stream has continuity because

it is a stream but at the same time it keeps on changing its flow depending upon the changes in the routes. Similarly, managing continuity and change forces simultaneously is the concept of FSS.

14.2.2 Soft and Aerated Drinks Industry in India (Ministry of Food Processing Industry 2012)

Indian soft drink market in carbonated category is worth Rs 60 billion and growing now at 5% annually. The two main companies who have more than 95% of this market are Pepsi and Coke. The aerated beverages sector is an important sector in India as many allied industries like sugar, refrigeration, glass, paper, and transport are getting benefited because of this. This segment is catering to all age-brackets and income groups. This industry exports goods worth more than Rs. 2 billon and contributes over Rs. 12 billion through tax and other contributions.

In India, because of very low per capita consumption of soft drinks, there are huge possibilities of growth. In China this sector is growing by 16% annually and Russian market is growing by 24% and similar numbers are estimated by industry in India.

The industry estimates that the beverage market should grow at twice the rate of GDP growth. The Indian market should have, therefore, grown by at least 12%. However, it has been growing at a rate of about 6%. In contrast, the Chinese market grew by 16% a year, while the Russian market expanded at almost four times the growth rate of the Indian market.

In India two main companies PepsiCo and Coca-Cola are of US origin. Coca-Cola operates through 35 plants and 16 franchisees throughout the country, while PepsiCo has 20 plants and many franchisees and currently PepsiCo is consolidating its franchisees. M/s Varun Beverages Limited (VBL), a group company of RJ Corp, is the biggest franchisee of PepsiCo in India serving nearly 50% of territories through its own manufacturing plants and distribution network. PepsiCo entered India in 1989 and has grown to become one of the country's leading food and beverage companies.

14.3 Supply Chains in Food and Beverages Industry

Beverage industry is quite unpredictable in nature as there is huge supply variation due to various factors like weather conditions, agricultural production, customer demands, and other seasonal factors like festive seasons which result in fluctuating demand and unpredictability. In order to meet this challenge vertical alliances are often preferred (Iijima et al. 1996).

Food and beverages market has always faced a challenge of price reduction; however, with the entry of multinationals, who have more purchasing power, the

market condition has improved (Vlachos 2002). Indian scenario is similar to this where multinational manufacturers and corporate retailers focus on streamlining the supply chain and thereby help to reduce delays, leakages, and wastage in the supply chain. These benefits are sometime passed on to the farmers in terms of higher prices for their produce/products and to consumers in terms of lower prices that they pay.

14.4 Methodology and Problem Formulation

Logistics problems are often complex real-world problems and are not very structured. To understand those problems and provide a realistic solution, a multidisciplinary and cross-function approach is often used. Since problems are complex, real-life case studies are often used to find solution (Näslund 2002). Seuring (2008) also highlights, in his research study, the importance of case study-based research for supply chain researchers.

14.5 Case Study

VBL is a franchise of Pepsico for the past 20 years. It handles approximately 55% volume of Pepsico in India, Africa, Nepal, and Sri Lanka. The company handles over 400 stock keeping units (SKUs) spread over 15 different brands and 19 different pack sizes. Being a bottling plant, it is subjected to uncertainties of demand forecasting caused by brand promotion activities, limited time offers, product launches, location-wise material requirements planning (MRP) variance, etc. The distribution chain starts at their bottling plants; it covers depots/warehouses, distributors, and ends with customers which are the shops or outlets from where consumers pick up the products for their consumption. They have two different types of fleet that handle this distribution—primary vehicles (around 200 in number) which distribute from the bottling plants to the depots and secondary vehicles (around 1000 in number) which distribute from the depots to the distributors/customers.

The supply chain function of the company was created in 2009, prior to which it was handled by the commercial department. While SAP (An ERP Software) had been introduced in the organization in 2008, it was around 2010 that the system was fully integrated and the supply chain management (SCM) function started to provide full benefits of the IT investment.

VBL has a large secondary fleet which incurs a huge operation cost that affects the company's margins. In addition, secondary transportation is handled by the sales team. While the route allocation is done by them, the cost of distribution gets allocated to the SCM function (cost details are available in Appendix A).

VBL was looking for sound transportation strategy so that they can reduce the cost of operations and do a strategic transport planning. They were facing multiple challenges in terms of existing infrastructure and technology.

Globalization has brought in enough complexity in today's business. Now world class technologies are available to all the organizations. As a result, the supply chain has become a crucial area for the cost reduction and margin improvement. It is imperative that the net margin of the product also depends on the transport cost but at the same time customers demand better service delivery and improved performance in terms of SKU availability. The complexity and chaos has led to emergence of unavoidable paradoxes that a business house needs to balance. The successful companies in today's world strive to excel by balancing the paradoxes by implementing flexible systems.

In order to create a sound transport strategy that helps in designing dynamic routing for optimization of secondary transportation, we thought of using *FSS tools and methods*. This is an attempt to implement a strategic change in transport department of a company keeping continuity of various resources. We intend to use FSS for implementing the strategic change (Sushil 2013; Khare 2015).

Following steps of FSS are used in this project.

I. Identification of continuity forces.
II. Identification of change forces.
III. Analysis of continuity forces in terms of their vitality, desirability, and burden.
IV. Analysis of change forces in terms of their impact.
V. Strategic direction diagram for the current scenario.
VI. Strategy formulation matrix of the current scenario.
VII. Identification of correct strategy.
VIII. Analyzing the results and future plans.

14.5.1 Creating Transport Strategy

I. Identification of Continuity Forces

VBL has a large secondary vehicle fleet. Current transport operation is a huge cost and is affecting VBL's margins. Secondary transport is currently controlled by sales team. Secondary vehicles load allocation and routing is planned by sales. Territory allocation is not based on any scientific data. Invisibility of asset utilization is also a problem. Route allocation is also not based on any infrastructure data.

After discussion with supply chain managers, the following continuity forces are identified:

- Infrastructure (existing trucks, lorries, Tata Ace, tempo, etc.)
- Technology (software for tracking, monitoring)
- Manpower (existing manpower specially drivers)
- Distribution network
- Customer base (retailers)
- Performance (delivery time, delivery schedule, SKU availability)
- Current packaging (cartons, shrink wraps, shells)
- Current product mix (pet, glass bottle)

II. Identification of Change Forces

- Competition (less price, better delivery time, better SKU availability)
- Customer needs (better price/retailer margin, better schemes, better service)
- Productivity (improve productivity)
- New technology (GPS tracking, software availability)
- Environment concerns
- Cost of operation
- Road infrastructure (flyovers, new roads)

III. Analysis of Continuity Forces in terms of their Vitality, Desirability, and Burden

The "vital, desirable, and burden (VDB) analysis" is carried out and is as shown in Table 14.1.

IV. Analysis of Change Forces in Terms of their Impact

The "impact analysis" is carried out and is as shown in Table 14.2.

V. Strategic Direction Diagram for the Current Scenarios

Strategic direction diagram: the strategy landscape can be summarized on the strategic direction diagram, which in a simple manner puts continuity and change of factors at one place. It gives continuity in terms of factors to be maintained and brings out change in terms of reduce or rise from the current reality (Fig. 4.1).

Table 14.1 VDB analysis

Category	Continuity force
Vital	Distribution network, customer base, performance
Desirable	Manpower, infrastructure
Burden	Technology, infrastructure

Table 14.2 Impact analysis

Category	Change force
High impact	Cost of operation, productivity, customer needs
Medium impact	Competition
Low impact	Environmental concerns

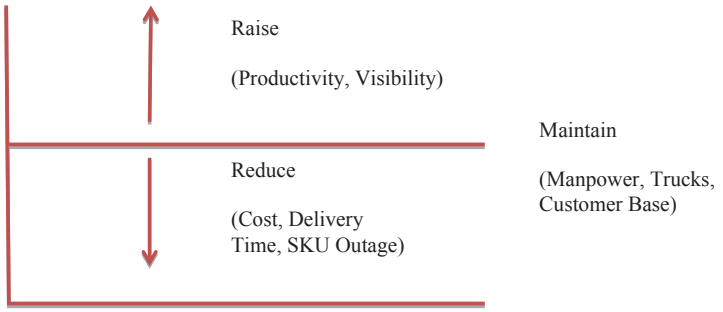


Fig. 14.1 Strategic direction diagram for secondary transport

VI. Strategy Formulation Matrix of the Current Scenario

Strategy formulation matrix is used for ideation of transport strategy. This matrix relates relevant combinations of continuity and change forces to generate strategies and is shown in Table 14.3.

Table 14.3 Strategy formulation matrix for secondary transport

	Change forces					
Continuity forces	Competition	Customer needs	New technology	Environment concerns	Productivity	Road infrastructure
Infrastructure			Use GPS for tracking			
Technology			Use software for analyzing			
Culture		Train manpower				
Distribution network						
Customer base						Use latest road maps
Performance			Dynamic routing			
Current packaging					Use bigger packages like palate	
Current product mix						

VII. Identification of Correct Strategy

It was decided that we should use new technology, GPS, for tracking of vehicle movement in a territory. We should map that movement in the latest infrastructure map (road map). We should analyze that data and optimize the route movement.

Main Objectives of Strategy

- Strategic territory planning.
- Optimizing daily routing of vehicles, thus reducing the number of vehicles in each territory.
- Enhancing visibility by tracking of all vehicles by using vehicle telematics (GPS).
- Creating an analytics dashboard.

Benefit of Strategy

The project would have the following benefits: reduce costs by reducing:

- Mileage
- Overtime
- Fuel usage
- Maintenance cost

Improve productivity by:

- Balancing capacities and workloads
- Improving resource utilization
- Optimizing the assignment of sales, service, and delivery sequence
- Optimizing sales, service and delivery routes
- Arrange same route pick-ups and deliveries

Improve customer service by:

- Increasing visibility
- Reduce resolution time
- Better planning for growth, holidays, and seasonal swings
- Taking last minute orders

Pilot Project for Implementing the One Part of the Strategy

As the initial pilot was done between 15th March and 15th April 2013, we have selected a part of Ghaziabad as the territory (territory related information available in Appendix B). We created a team of sales persons and supply chain persons. The

team obtained infrastructure data from MapmyIndia, did an analysis of the sales volume for the purpose of allocating resources based on the sales volume. They redefined the sales territory, redrew the routes, and installed the monitoring system on ten vehicles. They also created a dashboard to monitor and capture cost.

Impact of the Application

As part of the pilot, the team generated various reports, such as:

- Vehicle utilization report
- Mileage report
- Geo fence trip report
- Halt report
- Idle report
- First exit report through SMS

The team found significant reduction in important parameters like mileage, fuel consumption, and maintenance cost for that territory (Appendix C).

14.6 Conclusion

In terms of the overall transportation cost, the average monthly cost of INR 2.22 lakhs in FY 2011–2012 (April to March) came down to INR 2.05 lakhs between April to September in FY 2012–2013 (details in Appendix D). The team attributed 60 % of this savings to the program with a confidence level of 90 %. While for a single sub-territory, the amount may not be great, the project has been very well received. The projected savings to the company, once this, is implemented across all territories (with a conservative assumption of 5 % reduction of vehicles) is INR 3 Crores after accounting for the GPS hardware and operation costs (calculations are given in Appendix E).

With regard to intangible outcomes, the team has benefited tremendously. Change management was a big issue here but project team was able to overcome the initial reluctance of the sales team, and got them enthused as well, once they understood and accepted the advantages. Some of the barriers the team faced, such as change management, peak season sales, nontransparency of data, support from vendors, were challenging. The results are in compliance to the research problem and suggested that the flexibility in articulating a suitable strategy for transportation management impacts the overall efficiency of the transportation system.

The present study even though has made significant contributions for practitioners, academics, and logistics managers; nevertheless, there are a few limitations such as:

- Study considered a limited number of issues associated with flexibility in transportation management as part of logistics and supply chain of Indian soft drink industry.
- The critical issues associated with the research question, in select firm under study, were derived from brainstorming sessions with senior managers in select firm and as such may have been subject to usual limitations of such surveys.
- For empirical study, only one firm has been selected hence the findings may not be applicable for the entire industry.
- Apart from above limitations, limitations in the research methodology employed in this study are also to be mentioned—methodological limitation is regarding the way some of the variables were constructed. Therefore, it is possible that the results may reflect biased views of sales mangers force/managers of the sample banks. However, due attempt was made to rectify this by using other sources of information.

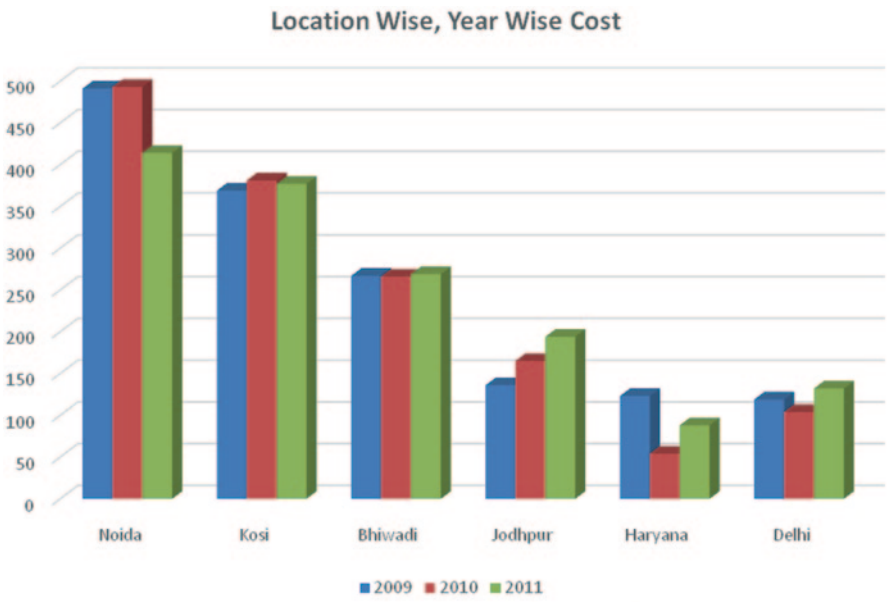
The following suggestions emerged for future research in this area:

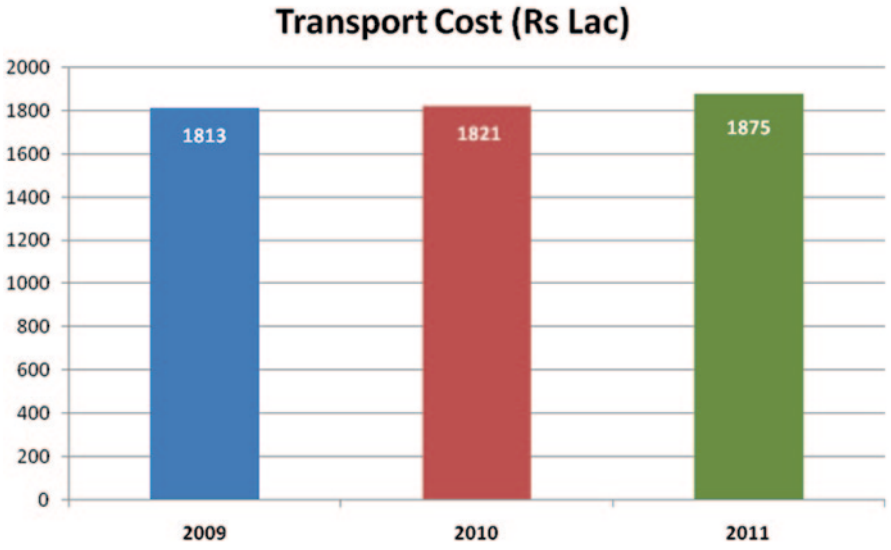
- Future research attempting a comparison between two or more firms in the Indian soft drink industry for their improved "flexibility in transportation management strategy for improved efficiency."
- A cross-sectoral study for a comparative study of logistics firms.
- The findings generated by this study can be further extended by bringing more verticals of logistics.

Appendix A—Transportation Cost

Total Transportation Cost—Location wise, Year wise

Territory	2009	2010	2011
Noida	307	358	401
Kosi	491	493	414
Bhiwadi	369	381	377
Jodhpur	267	266	269
Haryana	136	165	194
Delhi	123	54	88
Goa	119	104	132
Total	1813	1821	1875


Location Wise, Year Wise Cost
500
450
400
350
300
250
200
150
100
50
0
Noida
Kosi
Bhiwadi
Jodhpur
Haryana
Delhi
2009
2010
2011


Transport Cost (Rs Lac)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1813
1821
1875
2009
2010
2011

Appendix B—Territory Information for Ghaziabad

Territory	WUP
C&F	Ghaziabad
Number of CE	2
Number of sales man	34
Number of route	28
Number of vehicles	32
Number of outlet	1760
Average sale per day	3500 cases
No of routes	28
Average sale of depot	3500 per day
Total outlet of depot	1760
Average outlet	63 per route
Average outlet covered	50 per vehicle
Average sale per day/per outlet	02
GPS installed on	10 vehicles

Appendix C—Consumption Pattern

	April 12	May 12	June 12	July 12	Aug 12	Sep 12
Mileage (km)	12,876	12,044	11,870	11,450	11,388	11,270
Fuel (litres)	2476	2316	2283	2202	2190	2167
Maintenance (INR)	20,000	22,000	21,000	18,500	19,000	20,000

Appendix D—Transportation Cost

Figures are in lakhs INR

	April	May	June	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Cost in 2011–2012	2.20	2.21	2.22	2.23	2.22	2.19	2.21	2.21	2.19	2.19	2.22	2.33
Cost in 2012–2013	2.14	2.07	2.04	2.01	2.00	2.06	2.23	2.30	2.09	2.20	2.30	2.45

Appendix E—Estimates of Annual Savings

OPEX (Operational Expenditure) saving (monthly)

- One vehicle out of ten reduce after merging the route and design the routing network of secondary vehicles.
- Operation cost (fuel saving) = Rs. 9500
- Maintenance cost = Rs. 6000
- Driver/helper salary = Rs. 11,000
- Statutory documents = Rs. 2300
- Less GPS hardware cost = Rs. 130
- Less GPS operation cost = Rs. 350
- *OPEX saving = Rs. 28,320*
- *OPEX saving of 1 year = Rs. 339,840*

Capex (Capital Expenditure) Saving

Cost of one vehicle	Rs. 400,000
Net saving of one vehicle	Rs. 739,840

Approx saving of 41 vehicles (if 5% vehicles are reduced) after implementing the project = Rs. 30,333,440

References

Bahrami H (1992) The emerging flexible organization: perspectives from silicon valley. Calif Manage Rev 34(4):33–52

Fang X, Yuan J, Jiang C (2011) Dynamic transport planning in logistics of sports tour resource based on MAS and GIS, ICTE 2011. pp 2274–2279

Iijima M, Komatsu S, Katoh S (1996) Hybrid just-in-time logistics systems and information networks for effective management in perishable food industries. Int J Prod Econ 44:97–103

Khare SB (2015) Elements of flowing stream strategy crystal for telecom service providers. In: Sushil, Gerhard C (eds) Systemic flexibility and business agility, flexible systems management. Springer, New Delhi

Lambert DM, Stock JR (1993) Strategic logistics management. Irwin/McGraw-Hill, New York

Martin C (2011) Logistics and supply chain management. Pearson Education, UK

Ministry of Food Processing Industry (2012) Soft and aerated drinks. http://mofpi.nic.in/ContentPage.aspx?CategoryId=548. Accessed October 2013

Näslund D (2002) Logistics needs qualitative research—especially action research. Int J Phys Distrib Logist Manage 32(5):321–338

Reinhard G, Joseph R, Jim T, Michael D' (PWC 2011) Achieving operational flexibility in a volatile world Global supply chain trends 2011, PWC-PRTM Report

Saxena JP, Sushil, Vrat P (2006) Policy and strategy formulation—an application of flexible systems methodology. GIFT Publishing, Delhi

Seuring SA (2008) Assessing the rigor of case study research in supply chain management. Supply Chain Manage Int J 13(2):128–137

Sushil (2000) Concept of systemic flexibility. Glob J Flex Syst Manage 1(1):77–80

Sushil (2005) A flexible strategy framework for managing continuity and change. Int J Glob Bus Competit 1(1):22–32

Sushil (2012a) Flowing stream strategy: managing confluence of continuity and change. J Enterp Transform 2(1):26–49

Sushil (2012b) Making flowing stream strategy work. Glob J Flex Syst Manage 13(1):25–40

Sushil (2013) Flowing stream strategy: leveraging strategic change with continuity. Springer, New Delhi

Upton DM (1994) The management of manufacturing flexibility. California Manage Rev 36(2):72–89

Vlachos IP (2002) Business-To-business E-Commerce: an innovative tool for food chain management. In Sideridis AB, Yialouris CP (eds.) The impact of ICT in agriculture, food and environment, Proceedings of 1st Pan-Hellenic Conference of Hellenic Association of Information and Communication Technology in Agriculture, Food and Environment (HAICTA), Athens, Greece, 6–7 June, 37–44