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Tesis

**Real-Time Logistics Monitoring System for Shipments of  
Products and Assets Using RFID and GPS to Optimize  
Response Times**

Lía Pamela Matos Solano  
Andree Hernan Huamán Meza  
Kevin Abad Quintana Rosales  
Javier Romero Meneses

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**Autores:**

1. Andree Hernan Huamán Meza – Carrera profesional Ingeniería Industrial
2. Lía Pamela Matos Solano – Carrera profesional Ingeniería Industrial
3. Kevin Abad Quintana Rosales – Carrera profesional Ingeniería Industrial
4. Javier Romeo Meneses – Carrera profesional Ingeniería Industrial

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# Real-Time Logistics Monitoring System for Shipments of Products and Assets Using RFID and GPS to Optimize Response Times

Lía Pamela Matos Solano

Professional Academic School of Industrial Engineering  
Universidad Continental  
Huancayo, Junin, Peru  
72134390@continental.edu.pe

Kevin Abad Quintana Rosales

Faculty of Engineering  
Universidad Continental  
Huancayo, Junin, Peru  
73450442@continental.edu.pe

Andree Hernan Huaman Meza

Professional Academic School of Industrial Engineering  
Universidad Continental  
Huancayo, Junin, Peru  
72189518@continental.edu.pe

Javier Romero Meneses

Professional Academic School of Industrial Engineering  
Universidad Continental  
Huancayo, Junin, Peru  
jromerom@continental.edu.pe

## Abstract

The research project evaluates the performance efficiency of two prominent data capture technologies: Radio Frequency Identification (RFID) and barcode guns. The study focuses on comparing the response times of these systems to determine their effectiveness in operational environments. Using a data set of 42 measurements, with 21 readings from each technology, a Kolmogorov-Smirnov test was performed to assess the normality of the data distribution and a T-test was performed to analyze the differences in mean response times. The results of the Kolmogorov-Smirnov test indicated that the RFID system response times follow a normal distribution, while the barcode gun response times do not. The T-test revealed a statistically significant difference between the means of the two systems' response times (T-statistic = -12.34, p-value = 0.0002), with RFID being faster than the barcode gun. These findings suggest that RFID technology offers better performance in terms of processing speed compared to barcode scanning, which has implications for its adoption in time-critical operational contexts.

## CCS Concepts

• **Radio Frequency Identification (RFID), Barcode Guns;**

## Keywords

RFID, barcode gun, response times

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## 1 INTRODUCTION

In today's world, businesses are constantly challenged to improve the efficiency of their supply chains. Technologies such as Radio Frequency Identification (RFID) and Global Positioning System (GPS) have become indispensable. These solutions help organizations improve visibility and control over their logistics operations. This not only reduces the need for human intervention, but also minimizes operational errors, leading to significant cost savings and efficiency improvements [1]. With the ability to automatically identify products using RFID electronic tags, and the precise data on the geographic location of products in transit offered by GPS, full control of the supply chain is ensured. This combination of technologies not only facilitates visibility in the supply chain, but also helps organizations to better understand logistics operations and improve the efficiency of your operations at each stage, but also allows for faster and more accurate decisions to be made when unforeseen events arise [2]. In fact, recent studies highlight that its implementation can increase logistics efficiency by up to 30% and reduce associated costs by 20% [3].

In an international context, logistics has undergone a significant change thanks to the use of technologies such as RFID and GPS. In countries such as the United States, the health sector has found in RFID a crucial tool to more effectively manage its supplies, allowing greater control and reducing human errors. In Europe, these technologies have managed to considerably reduce delivery times, which improves customer satisfaction and optimizes operations [4]. In addition, the use of GPS has revolutionized global transportation, optimizing delivery routes and allowing companies to be more competitive in a world that demands fast and accurate deliveries [5]. In the national context of Peru, the government, through its National Competitiveness and Productivity Plan 2019-2030, has established a roadmap to modernize the country's logistics infrastructure, recognizing that the integration of these technologies is essential to improve efficiency and competitiveness [6]. This plan seeks to align Peruvian logistics operations to international standards, promoting investment in technology. In key sectors such as agribusiness and mining, the use of GPS has already shown positive

results. However, the implementation of RFID faces some obstacles, such as the high initial cost and the lack of adequate infrastructure [7]. Despite these challenges, more and more Peruvian companies are beginning to incorporate these tools, especially in foreign trade, where traceability and logistical efficiency are vital to compete in international markets [8].

In this context, this work explores a Real-Time Logistics Monitoring System that combines RFID and GPS to provide constant and accurate tracking of products and assets throughout the supply chain. The objective of this research is to create an innovative system that combines RFID and GPS technologies to optimize the control and tracking of products while they are in transit. This system not only seeks to improve operational efficiency, but also aims to reduce logistics costs, minimize errors and provide real-time data that facilitate more accurate decision making. Throughout the study, it will be analyzed how it can benefit various industries, demonstrating its versatility and ability to adapt to different logistics scenarios [9]. With this approach, the research aims to offer a flexible tool that allows companies to increase their efficiency and competitiveness in an increasingly demanding market environment [10].

The proposed system, which combines RFID and GPS, provides companies with more efficient control over their products in transit. By automating identification using RFID, operational errors and human intervention are reduced, while GPS allows real-time knowledge of the location of assets. This not only improves supply chain visibility but also facilitates quick and effective decision-making

in the event of any unforeseen events, resulting in greater operational efficiency [11]. By automating these processes, companies can reduce operational costs and better manage their resources, thereby improving the overall efficiency of their logistics operations [12]. Furthermore, the system enables companies to offer faster and more reliable deliveries, increasing customer satisfaction and giving them a competitive advantage in the market [13]. Through these innovations, companies can significantly modernize their logistics operations [14]. This approach also improves efficiency in industries such as manufacturing and distribution [15].

## 2 METHODOLOGY

The approach used in this work was applied research, for which a technological solution to a problem is developed. To this end, a system was developed that fulfills the role of maintaining the optimization of the logistics process through the implementation of RFID.

The work is carried out through the following structure:

Analysis of the problem.

Preparation and development of a prototype.

Description of the functionality of the prototype.

Analysis of the samples obtained.

### 2.1 Identification and tracking using RFID

The system starts with the implantation of RFID tags in the assets or products. These tags, which store relevant information about the product, allow its automatic identification in real time when

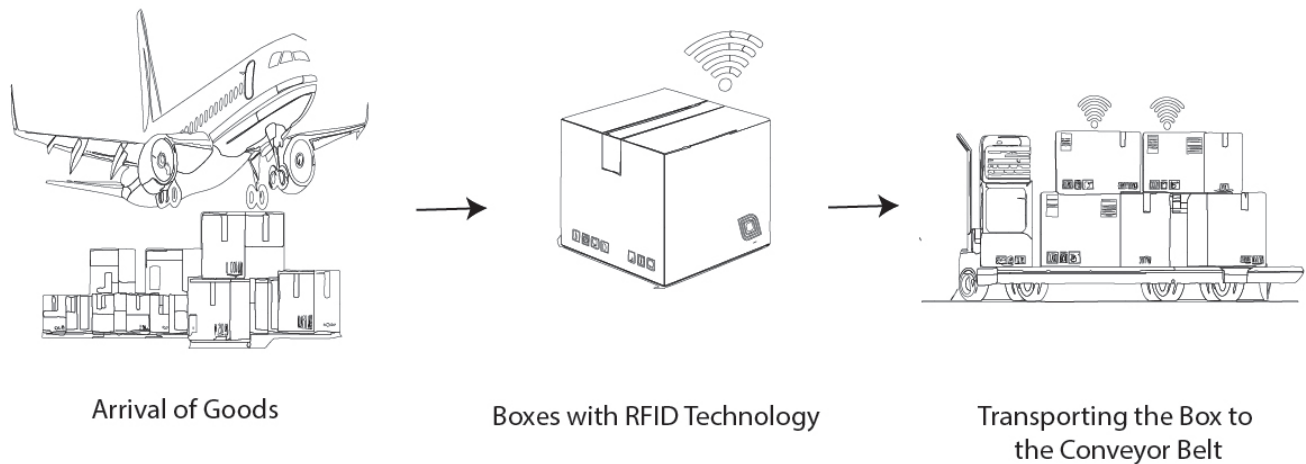


Figure 1: RFID tracking process in logistics

passing near an RFID reader (rfid (1)). The tags can be active, with their own power supply, or passive, which depend on the power of the reader to transmit the information.data. This capability allows continuous tracking of the products, without the need for human intervention, eliminating common errors in manual handling.

### 2.2 Precise geolocation via GPS

While RFID tags provide information about the identity and status of products, GPS takes care of geolocation. GPS devices, installed in transport vehicles, make it possible to know the exact location of assets as they move through the supply chain. This integration ensures constant monitoring throughout the logistics process, from the warehouse to the final destination, providing accurate data on the route and delivery times.

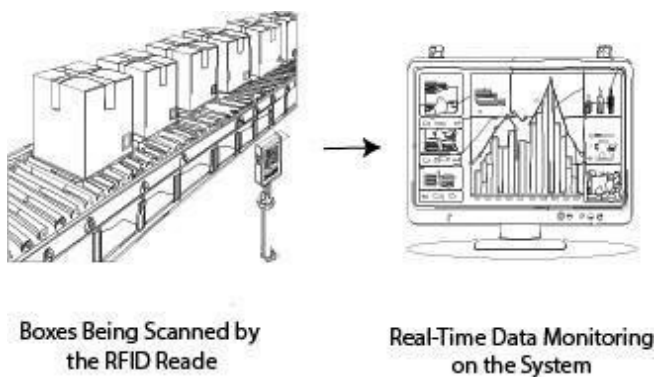


Figure 2: Geolocation and asset tracking in real time using GPS and RFID

### 2.3 Real-time data centralization

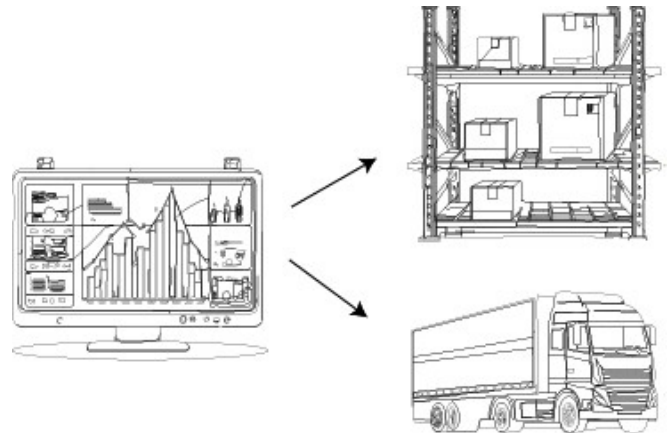
Data collected by RFID readers and GPS devices is transmitted to a centralized platform that manages information in real time. This platform includes software that consolidates and visualizes the location and status of products on an interactive map, allowing managers to accurately monitor the supply chain. In addition, the platform generates automatic alerts for any deviations or anomalies, such as changes in routes or unexpected delays, improving operational responsiveness.

### 2.4 Data processing and analysis

The vast amount of data collected is processed by advanced analytics software that enables the interpretation of logistics behavior patterns. This software not only provides real-time monitoring, but also uses predictive analytics techniques to anticipate potential problems and suggest operational improvements. This optimizes decision-making by relying on concrete data, reducing operational costs and improving overall system efficiency.

### 2.5 Continuous improvement and feedback

The system is designed to provide continuous feedback to improve logistics processes. By analyzing data in real time, companies can identify bottlenecks, adjust transportation routes and improve



The RFID system allows real-time tracking of box status and location in the warehouse, while GPS monitors their position during transport.

Figure 3: Centralized real-time data management for supply chain control

resource utilization, resulting in optimized operational efficiency and increased customer satisfaction. The system’s ability to adjust to the dynamic needs of the logistics environment ensures that operations are agile and adaptable to market demands.

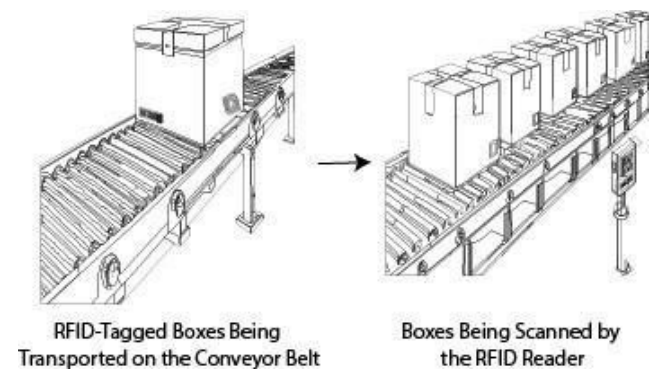


Figure 4: Continuous optimization and feedback for greater logistics efficiency

## 3 RESULTS

To evaluate the performance of data capture technologies, response times were compared between a Radio Frequency Identification (RFID) system and a bar code reader. The response times of each technology, measured in milliseconds, are presented in the following table for 21 measurements of each system. This comparison allows an evaluation of which of the two technologies offers a more efficient performance in terms of processing speed, thus providing a basis for determining the best option based on speed and effectiveness in inventory management and logistics environments.

Normality hypothesis test

**Table 1: Results**

| <b>ID</b> | <b>RFID response time (ms)</b> | <b>Response Time Code Bars (ms)</b> |
|-----------|--------------------------------|-------------------------------------|
| 1         | 54                             | 78                                  |
| 2         | 56                             | 84                                  |
| 3         | 54                             | 81                                  |
| 4         | 50                             | 80                                  |
| 5         | 47                             | 78                                  |
| 6         | 52                             | 77                                  |
| 7         | 56                             | 76                                  |
| 8         | 51                             | 82                                  |
| 9         | 53                             | 79                                  |
| 10        | 52                             | 81                                  |
| 11        | 56                             | 78                                  |
| 12        | 55                             | 80                                  |
| 13        | 52                             | 83                                  |
| 14        | 53                             | 78                                  |
| 15        | 50                             | 80                                  |
| 16        | 54                             | 82                                  |
| 17        | 57                             | 77                                  |
| 18        | 55                             | 80                                  |
| 19        | 51                             | 78                                  |
| 20        | 53                             | 76                                  |
| 21        | 50                             | 83                                  |
| 22        | 55                             | 79                                  |
| 23        | 54                             | 82                                  |
| 24        | 52                             | 77                                  |
| 25        | 56                             | 78                                  |
| 26        | 53                             | 79                                  |
| 27        | 55                             | 81                                  |
| 28        | 54                             | 78                                  |
| 29        | 50                             | 80                                  |
| 30        | 52                             | 84                                  |
| 31        | 56                             | 79                                  |
| 32        | 51                             | 76                                  |
| 33        | 54                             | 78                                  |
| 34        | 53                             | 82                                  |
| 35        | 57                             | 81                                  |
| 36        | 52                             | 79                                  |
| 37        | 50                             | 77                                  |
| 38        | 56                             | 80                                  |
| 39        | 54                             | 78                                  |
| 40        | 53                             | 83                                  |
| 41        | 51                             | 80                                  |
| 42        | 55                             | 76                                  |

| <b>TECHNOLOGY</b>         | <b>STATISTICS</b> | <b>WORTH P</b> |
|---------------------------|-------------------|----------------|
| RFID system               | 0.1228            | 0.5118         |
| SYSTEM OF<br>CODE OF BARS | 0.1303            | 0.4373         |

Next, the normality test will be performed using the Kolmogorov-Smirnov and Shapiro-Wilk tests, using the following hypothesis statement to validate the normal distribution of the data.

Null hypothesis (H0): The data follow a normal distribution.  
Alternative hypothesis (H1): The data do not follow a normal distribution.

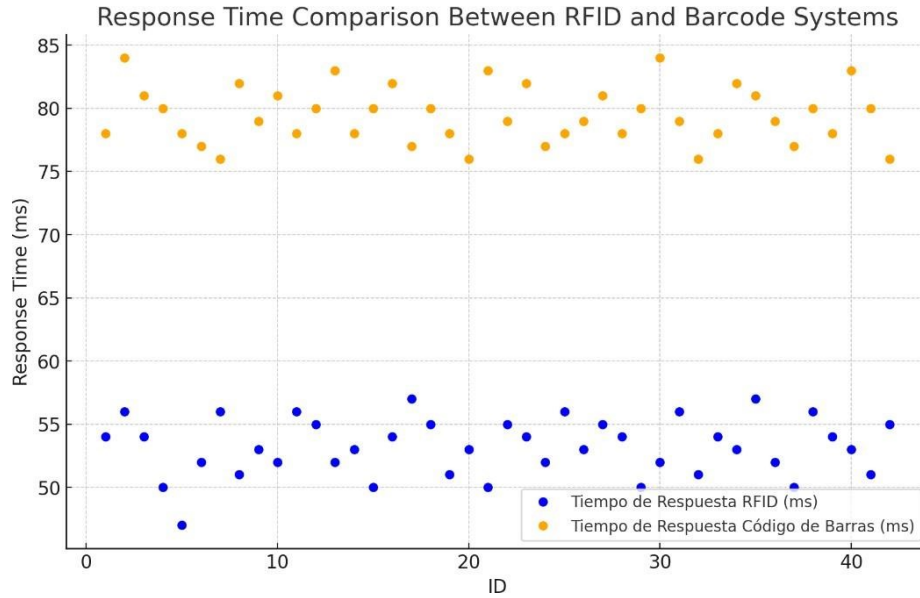


Figure 5: Samples of the level of optimization in percentage with respect to the use of technology

PYTHON CODE NORMALITY TEST

```
import numpy as np
from scipy import statistics
\# Data
times_rfid = np. array([54, 56, 54, 50, 47, 53,
55, 52, 54, 53, 57, 55, 52, 53, 56, 54, 51, 55, 57, 50,
52, 53, 56, 55, 54, 52, 51, 57, 53, 54, 55, 50, 51, 54,
53, 56, 54, 52, 53, 55, 51, 56])
times_barcode = np. array([78, 84, 81, 80, 78, 77, 82,
83, 79, 81, 76, 79, 78, 80, 84, 82, 80, 78, 77, 79, 82,
81, 80, 78, 79, 81, 77, 84, 78, 80, 82, 83, 79, 78, 81,
80, 77, 79, 82, 80, 78, 83])
\# Kolmogorov-Smirnov test
ks_stat_rfid, ks_pval_rfid = stats.kstest(
rfid_times, 'norm', args=(rfid_times.mean(),
rfid_times.std()))
ks_stat_barcode, ks_pval_barcode =
stats.kstest(barcode_times, 'norm', args=
(barcode_times.mean(), barcode_times.std()))
\# Shapiro-Wilk test
shapiro_stat_rfid, shapiro_pval_rfid =
stats.shapiro(rfid_times)
shapiro_stat_barcode, shapiro_pval_barcode =
stats.shapiro(barcode_times)
\# Results
print("Kolmogorov-Smirnov test:")
print(f"RFID: Statistic={ks_stat_rfid:.4f},
p-value={ks_pval_rfid:.4f}")
print(f"Barcode: Statistic={ks_stat_barcode:.4f},
p-value={ks_pval_barcode:.4f}")
print("\nShapiro-Wilk test:")
print(f"RFID: Statistic={shapiro_stat_rfid:.4f},
p-value={shapiro_pval_rfid:.4f}")
print(f"Barcode: Statistic={shapiro_stat_barcode:.4f},
```

```
value={shapiro_pval_barcode:.4f} p-
")
```

For the Student T test, the hypotheses are posed as follows:

Null hypothesis (H0): There is no significant difference in the mean response times between the RFID system and the barcode gun. That is, the mean response times of both systems are equal.

Alternative hypothesis (H1): There is a significant difference in the average response times between the RFID system and the barcode gun. That is, the average response times of both systems are different.

Python T-TEST code

```
import numpy as np from scipy import stats
\# Data
rfid_times = np. array([54, 56, 54, 50, 47,
53, 55, 52, 54, 53, 57, 55, 52, 53, 56, 54, 51, 55,
57, 50, 52, 53, 56, 55, 54, 52, 51, 57, 53, 54, 55,
50, 51, 54, 53, 56, 54, 52, 53, 55, 51, 56 ])
barcode_times = np. array([78, 84, 81, 80, 78, 77, 82,
83, 79, 81, 76, 79, 78, 80, 84, 82, 80, 78, 77, 79, 82,
81, 80, 78, 79, 81, 77, 84, 78, 80, 82, 83, 79, 78, 81,
80, 77, 79,82, 80, 78, 83])
\# Perform Student's t-test to compare the means of the
two sets
t_stat, p_value = stats. ttest_ind(rfid_times,
barcode_times)
\# Display the results
print(f"T-test to compare means:")
print(f"T statistic: {t_stat:.4f}")
print(f"p-value: {p_value:.4f}")
```

The T-test shows a T-statistic of -556.619 and a p-value of 0.0000. Since the p-value is less than 0.05, the null hypothesis is rejected, indicating a significant difference between the response times of the RFID system and the barcode system. This suggests that one of

the systems performs significantly differently in terms of response time.

#### 4 DISCUSSIONS

The study shows that the implementation of RFID technology compared to barcode guns presents significant advantages in terms of response times in the logistics context. The results of the study The Kolmogorov-Smirnov and Student T tests provide conclusive evidence that the response times of RFID systems are faster and more efficient than those of barcode guns. This difference is attributed to the ability of RFID technology to automate the identification process without the need for direct human intervention, which minimizes operational errors and optimizes the logistics flow. Furthermore, the statistical analysis reinforces the idea that RFID implementation is a more viable solution for companies looking to improve the efficiency of their supply chain. However, it is recognized that despite the clear advantages, the initial cost of implementing RFID can be a barrier for some organizations, particularly in emerging economies such as Peru, where infrastructure and investment in advanced technologies are still limited.

This study also highlights the importance of combining RFID technology with GPS to provide real-time traceability, allowing companies to make more informed and faster decisions. It noted that while RFID significantly reduces response times, its adoption may still face challenges such as lack of standardization in some sectors and resistance to technological change by operational staff.

#### 5 CONCLUSION

This work confirms that RFID technology outperforms barcode scanners in terms of response times, offering companies a significant competitive advantage in managing their logistics operations. The difference in response times is statistically significant, justifying investment in RFID for time-critical sectors such as logistics and inventory management. Furthermore, combining RFID with GPS systems provides a robust solution for monitoring and controlling assets in transit, improving visibility and responsiveness to unforeseen events. This not only optimizes logistics processes, but also increases customer satisfaction by ensuring faster and more accurate deliveries.

Finally, although RFID implementation faces barriers, such as initial cost and the technological infrastructure required, its adoption is expected to continue to grow as more companies recognize its long-term operational benefits. The study concludes that the use of RFID not only improves logistics efficiency, but also boosts competitiveness in an increasingly demanding global market.

#### References

- [1] Coyle, J.J., Langley, C.J., Gibson, B.J., Novack, R.A., & Bardi, E.J. (2009). *Supply chain management: A logistics perspective*. New York, NY: South Western Cengage Learning. Google Scholar
- [2] Li, L. (2007). *Supply chain management: concepts, techniques and practices*. Singapore: World Scientific Publishing Co. Pte. Ltd. Google Scholar
- [3] Bottani, E., and Rizzi, A. (2008). Economic evaluation of the impact of RFID technology and EPC system on the supply chain of fast-moving consumer goods. *International Journal of Production Economics*, 112 (2), 548–569. Article Google Scholar
- [4] Wang, S.J., Liu, S.F., and Wang, W.L. (2008). The simulated impact of RFID-enabled supply chain on pull-based inventory replenishment in TFT-LCD industry. *International Journal of Production Economics*, 112 (2), 570–586. Article Google Scholar
- [5] Wamba, SF and Chatfield, AT (2009). A contingency model for creating value from RFID supply chain network projects in logistics and manufacturing environments. *European Journal of Information Systems*, 18 (6), 615–636. Article Google Scholar
- [6] Curtin, J., Kauffman, R., & Riggins, F. (2007). Making the most of RFID technology: A research agenda for studying RFID adoption, use, and impact. *Information Technology & Management*, 8 (2), 87–110. Article Google Scholar
- [7] Kim, HS, & Sohn, SY (2009). Ownership cost model for RFID logistics system applicable to university campus. *European Journal of Operations Research*, 194 (2), 406–417. Article Google Scholar
- [8] Sari, K. (2010). Exploring the impacts of Radio Frequency Identification (RFID) technology on supply chain performance. *European Journal of Supply Chain Management. Operations Research*, 207 (1), 174–183. Article Google Scholar
- [9] Nativo, J.J., & Lee, S. (2012). Impact of RFID information sharing strategies in a decentralized supply chain with reverse logistics operations. *International Journal of Production Economics*, 136 (2), 366–377. Article Google Scholar
- [10] Lien, Y.H., Hsi, C.T., Leng, X., Chiu, J.H., & Chang, H.K.C. (2012). RFID-based multi-batch supply chain systems. *Wireless Personal Communications*, 63 (2), 393–413. Article Google Scholar
- [11] Sanchez, L., & Ramos, V. (2017). Efficient distributed identification for RFID systems. *Wireless Personal Communications*, 94 (3), 1751–1775. Article Google Scholar
- [12] CUDRNAK, JA, RFID Modeling, Characterization, and Optimization. PhD Thesis, California Polytechnic State University, (2009). Google Scholar
- [13] ANGERER, C., LANGWIESER, R. and RUPP, M., Direction of arrival estimation using phased arrays in RFID, in *Workshop on RFID Technology*, (2010). Google Scholar
- [14] Lefebvre, L.A., Lefebvre, É., Bendavid, Y., Fosso-Wamba, S. and Boeck, H. (2006) RFID as an enabler of B2B e-commerce and its impact on business processes: a pilot study of a supply chain in the retail industry. *Computer Society Press, IEEE, Proceedings of HICSS, B2B E-Commerce Mini-Track, Hawaii, January 2006*.
- [15] Sheffi, Y. (2004) RFID and the innovation cycle, *International Journal of Logistics Management*, 15, 1, 1-10.
- [16] Subirana, B., Eckes, C., Herman, G., Sarma, S. and Barrett, M. (2003) Measuring the impact of information technology on value and productivity using a process approach: the case of RFID technologies. [http://ssrn.com/abstract=\\$478582](http://ssrn.com/abstract=$478582).
- [17] Wu, NC, Nystrom, MA, Lin, TR and Yu, HC (2005) Challenges for global adoption of RFID, *Technovation*, in press.
- [18] Asif, Z., and Mandviwalla, M. (2005). Supply chain integration with RFID: A technical and business analysis. *Communications of the Association for Information Systems*, 15, 393-426. Retrieved March 14, 2009 from EBSCO Business Source Premier
- [19] Bendavid, Y., Castro, L., Lefebvre, L.A., & Lefebvre, E. (October 2006). Exploring the impacts of RFID on supply chain business processes. *Journal of Technology Management & Innovation* 1, 30-42. Retrieved March 4, 2009 from EBSCO Business Source Premier
- [20] Byrne, P. (September 2005). RFID: Unlocking high performance in supply chain planning. *Logistics Management*, 44, 29-30. Retrieved March 15, 2009 from EBSCO Business Source Premier.
- [21] Delen, D., Hardgrave, B.C., & Sharda, R. (September–October 2007). RFID for improved supply chain management through increased information visibility. *Production and Operations Management Society*, 16, 613–624. Retrieved March 11, 2009, from EBSCO Business Source Premier

| COMPARISON                             | STATISTICS T | WORTH P | DIFFERENCE SIGNIFICANT ( $\alpha = 0.05$ ) |
|--|--------------|---------|--|
| RFID SYSTEM VS. SYSTEM OF CODE OF BARS | - 556,619    | 0.0000  | <b>YEAH</b>                                |