



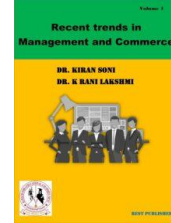
## Recent trends in Management and Commerce

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# Micro Fluidics for Food, Agriculture and Bios Systems Industries Using WASPAS Method

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### Abstract

Micro fluidics for Food, Agriculture and Bios stems Industries. A micro fluidic machine is a small transportable gadget which could complete pattern Pre-treatment, separation, dilution, mixing, chemical reaction detection and product extraction. These structures can increase evaluation speed and efficiency and of samples or reagents reduce consumption. Food is satisfactory other CSA practices and a few indicators about food quality are available approximately PA practices and bio fertilizers usage. Traceability is also an crucial parameter to guarantee meals fine and consequently PA troubles could be mentioned also in this factor of view food are fragmentary and contradictory. Micro fluidics for food, agriculture and biotechnology industries in growth and development. Weighted Total Product Assessment (WASPAS) analysis used the results of this study to provide decision makers with these Food safety, Food processing, Animal science, Plant production, Biofuel production is the Alternative and Evaluation Parameters in Affymetrix Inc., Agilent Technologies Inc, Akonni Biosystems Inc, Arrayx, Inc. Bio fuel production is got the first rank whereas is the Animal science is having the Lowest rank.

**Keywords:** Food Agriculture, Micro fluidics for Food, Food Agriculture and Bio systems Industries, WASPAS.

### Introduction

Microfluidics is the technological know-how and computing in small blocks or control systems technology fluids (10–nine to 10–18L) using channels measuring tens to hundreds of micrometers. Microfluidics In the early 1980s appeared and inkjet printheads DNA chips, lab-on-a-chip generation, micro-propulsion and in the development of micro-thermal technology was used. One of the fashionable, micro methods the following skills: small volumes ( $\mu\text{L}$ , nL, pL, fL) are small extent. Micro fluidics structures work at fees ranging from micro fluidic systems have made their way into numerous fields which include drug shipping and different regions of drugs. They are beneficial for developing state-of-the-art drug vendors with precise houses, pre-programmed launch profiles, and uniform sizes ranging from masses of nanometres to numerous micrometers. Advantages of micro fluidic cellular lifestyle encompass the potential to greater intently mimic the cellular's natural microenvironment. The take a look at of small numbers of cells or single cells with high temporal and/or spatial decision via growing non-stop perfusion lifestyle or chemical gradients, and through autoclaving represents agricultural and biosystems engineering packages. For methods and systems worried in engineering technological know-how and design. An AE degree is a valuable resource as you start your profession in sustainable manufacturing, publish-manufacturing and safe food, feed, Fibre, Wood and Misc agricultural and biological products and overall performance. Agricultural engineers new strategies, they design and build structures and products Job opportunities are plentiful are also varied. Currently there is a call for AEs always high. The Food and Agriculture Organization (FAO), a UN agency, strives to fight hunger and reduce poverty worldwide by improving agricultural, forestry and fisheries practices. Funded by industrialized countries and development banks, FAO operates mostly through public-private partnerships. Agriculture-related sectors Includes: food and beverage manufacturing; Food and beverage outlets; Food service and food and drinking establishments; Textiles, clothing and leather goods; and forestry and Aquarium. Agriculture and biological systems engineering refers to application. For processes and systems involved in engineering science and design. Uses knowledge in technology and science to develop equipment they create to improve agricultural production. It helps in crop production and animal comfort and food production systems, which require teams and team work in the agricultural sector. Agricultural and biological engineers they are for us they ensure that the necessities of life are met. They are safe and plentiful food and water, clean fuel and energy sources and help provide a healthy environment. In protecting people and animals with a fixed perspective they do all this and the environment.

### Food Agriculture

Food and Agriculture organization of the United Nations [FAO] 2013). Examples of CSA techniques include planting drought-tolerant seeds, using drip irrigation, and using shade trees in integrated agriculture. The current Then It's getting late performance further creates malnutrition, starvation and environmental degradation [3]. A mechanism for sharing and reusing agricultural IoT objects and agricultural specific knowledge. Although ontologies are already well established for other fields (e.g., eHealth), little effort has been made for agriculture, where it may seem especially unnecessary at present. The problem of semantic translation is more complex, but the Arrowhead framework is designed to deal with it. Now, there are test center systems that can be further matured by logical companies such as Consumer-Cogeneration, Legacy Integration, ModbusTCP, and Semantics Translator. In addition, ontology's specific to agriculture can be developed [2]. The agriculture quarter is at the crossroads of three important challenges. First, all components of food protection (availability, get admission to, utilization and price stability) are affected by weather trade, and version efforts are needed to acquire meals protection and shield rural livelihoods. Second, while developing (and frequently bad) weather impacts are felt in crop, cattle and fisheries systems, agricultural structures will need to produce 60% extra food by way of 2050 than they did in 2005/07, a chief business enterprise and pathway. Because of poverty, the number of smallholder farms should continue to grow anticipated to upward thrust to 750 million by means of 2030. Third, agriculture (and the wider food system) is a chief driving force of weather exchange, contributing 19-29% globally. Anthropogenic Greenhouse Gas (GHG) Emissions the region needs to lessen emissions by means of ~1 GtCO<sub>2</sub>e/year to fulfil the global intention of limiting temperature rise to 2 °C, followed as part of the Paris Climate Agreement in 2015. In addition to weather exchange, agriculture is likewise a primary driving force of transgressing planetary limitations for biosphere integrity, biotech, as cutting-edge technology and practices can only offer 21 to forty% of the specified mitigation in 2030. Michael flows, land shape exchange and freshwater use within the idea of climate-smart agriculture [4]. Agricultural sensors are scattered over agricultural land this information will be sent securely the cluster heads, which act as memory buffers or storage to send is securely received by the BS, the BS can provide users with up-to-date information for efficient decision making with minimal downtime. Automate agricultural production with minimal farmer burden. Monitoring data from agricultural sensors are intelligently and securely transmitted to the BS, which improves agricultural land monitoring and productivity. Simulation tests for the proposed framework revealed better results when compared to existing solutions based on different network parameters [6]. Attention to agriculture has progressively extended because the mid-2000s, with unique attention paid to agriculture-climate trade linkages all through the Durban 2011 Conference (COP), which include efforts to installation separate agricultural work software underneath the UN framework. Convention on Climate Change (UNFCCC) Although this attempt failed, the focal point on agriculture persisted to develop Temporal Optical Dimensions 4 The Conference of the Parties (COP 22) in Marrakech in 2016 turned into dubbed by using a few as the 'Agriculture COP' (CTA, 2016). The Coronivia Joint Task Force become set up at COP 23 in Bonn in 2017, underlining the importance of the rural zone in weather exchange variation and mitigation [5]. Some references to meals fine and meals fine of different CSA practices are available on PA practices and biofertilizer use. Traceability is likewise an important parameter to assure food satisfactory, so PA troubles will be mentioned from the factor of view that food category standards are fragmented and contradictory, and there may be no strong clinical evidence that they have higher health homes than traditional food. Pesticide content material. However, natural foods appear to have better antioxidant properties than traditional ones, and this has also been determined in response to different kinds of biofertilizers. The impact of nanofertilizers on food nice and dietary homes has now not yet been investigated, however their capacity superb results on plant boom and productiveness make their use a promising technology for sustainable agriculture [1].

#### Microfluidics for Food

Integrated biological procedures their price-powerful conversion into excessive-price bio molecules is vital to attaining the technical, monetary and environmental feasibility of bio resource era development. New techniques for the manufacturing of at certain intervals living bio molecules in food there is a high demand and pharmaceutical industries [41]. The aim of the present have a look at is to illustrate Low-level integrated approach to bio processing fee feedstuffs and converting it right health brought at a cost beneficial life product rich in molecules [12]. Biological structures have developed to mediate interactions and capabilities in unique sizes, shapes, and chemical substances. FAB branches of an antibody understand complementary antigen targets and bind to them the use of noncovalent forces. Viruses are icosahedral, bullet-fashioned, or rod-shaped, or they will have asymmetric morphologies. These geometries may additionally dictate their capability to affect unique cell types and regulate their residence time in the cell. Proteins gather into complex gadgets such as ribosomes to adjust mobile viability and feature. All these biological molecules and structures are within the nanometer size range. Although we do no longer completely elucidate how the physicochemical homes of organic nanostructures affect their feature, it's far clear that those organic structures [11]. Microfluidics—the technology of designing, production, and running devices and processes that handle small volumes of fluids (10–6 to 10–nine L)—has the ability to seriously exchange the manner dispersed meals systems are processed. Must be recognized by means of having channels with at least one size smaller than 1 mm. The gadgets have dimensions ranging from millimeters to micrometers. Microfluidics hardware requires one-of-a-kind layout and production from business system. More relevantly, for the reason that physics worried are unique, it's miles generally now not possible to scale conventional gadgets and anticipate them to work in microfluidics programs [22].

#### Food Agriculture and Bio systems Industries

**Agri-Food Supply Chain** This research aims to explore blockchain era with a focal point on meals and agriculture research. Therefore, a bibliometric approach changed into followed to become aware of key developments and topics in this domain by studying substantive articles, authors, countries and keywords. This studies attempts to expand a graphical map of bibliographic facts in food and agriculture research using R package deal bibliometrix and Visualization of Similarities (VOS) viewer software. Therefore, the present research completed the subsequent analyses: co-occurrence of writer keywords, more than one correspondence evaluation, bibliographic linkage evaluation, co-citation evaluation and community view graph evaluation. The findings of the community imaginative and prescient map classified meals and agriculture studies into three groups, and the maximum regularly used phrases within the name and summary of the articles were traceability, transaction, Internet of Things (IoT), safety, and meals supply. Chain [16]. Biological systems are more or much less considered a black box method. In the existing paintings, we clarify the aspects of sensitivity analysis and rationally become aware of the maximum appropriate sensitivity evaluation methods for the use of tremendously nonlinear dynamic models within the context of organic structures, we provide a brief review of Sopol. Global sensitivity indices and DGSM techniques. Consequently, we check out the behavior and performance of the supplied GSA strategies in "real-life" models of mammalian cellular cultures. A presentation of GSA techniques, particularly Sobol' international indices and DGSM, is offered on this phase [4]. Physiome mission in silico fashions need to be demonstrated against robust experimental data. Much of the 'input' records are already to be had, and with the development of recent tools and technology, insight into the sub-cell and molecular tiers of organic interest becomes increasingly more unique. In silico, organic systems are produced by means of quantitatively describing the constituent components and their interactions based on the conservation legal guidelines of strength, mass and momentum (Hunter & Smail 1989; Hunter 1995; see also Colston's review on this difficulty) [5]. Biological systems evolved in the closing many years cowl diverse ranges of structural are principal to understanding and improving organic structures [6]. Life enterprise the complexity of organic systems, confined information of biological techniques, and shortage of good enough method models has hindered the version of conventional PSE strategies. In the absence of model-primarily based strategies, technique optimization within the organic area is based on considerable and in a few cases redundant result in cost and time reduction by specifying greater informative assessments to reduce unnecessary testing and by way of method handy. Mathematical fashions are used to recognize and improve organic structures [8]. In the sector of biomedical and electronic studies, magnetic NPs are considered promising applicants for sensors, magnetic resonance imaging, and other implemented research. Iron oxide NPs, a well-known form of magnetic NP, can be synthesized the usage of chemical-physical methods. Magnetic field micro organism (MTB) also can constitute useful biological systems. Biological agent to synthesize Cu NPs. The average length turned into 24.5 nm and Cu NPs were located within the cellular wall of *H. Lixii* [69]. Due to the phenomenon of quantum confinement effect located in semiconductor quantum dots (QD); QD can be used inside the area of medical and organic imaging programs [9]. In addition to biocatalyst price, numerous different elements decide whether CFB2 or complete-mobile biocatalysis is preferred for the manufacturing of a given biomass. The most essential considerations consist of pathway complexity (consisting of ATP and cofactor necessities), the relative significance of response price and yield within the reaction, and the maturity of modern production era [10].

### **Food safety**

Food safety is food borne illness and preparing food to prevent injury refers to handling and storage procedures fork from farm to factory up to, food supply chain

### **Food processing**

Food processing is defined as the process of changing food from its natural state, such as heating, processing, freezing, drying, grinding and fermentation (Poti et al., 2015). From: Ensuring Global Food Security (Second Edition), 2022.

### **Animal science**

Animal science is the study of beef cattle, horses, Including sheep, goats, pigs and companion animals biological science of domestic livestock and its management. Livestock and companion animals to maintain improve and administer science, art and practice students learn methods.

### **Plant production**

Plant production system includes the basic genetic and physiological regulation of plant growth, soil, water, nutrients, disease and pest growth impact and management practices.

### **Biofuel production**

To convert biomass into a liquid or gaseous fuel, Bio fuels from their original form should be replaced. The most to do this the basic way, too much sugar (starch) or fermentation of fatty crops into ethanol It is mixed directly with petrol to run cars.

## **WASPAS**

WASPAS (Weighted total product evaluation) technique. In this way, two Essential contributions are madeesp. A completely new technique for evaluating the work of experts and the brand new LNN WASPAS version, which is multi-scale Enriches field of choice. Counsellors are seven Primarily by experts are evaluated based on 9 standards. After appearing sensitivity evaluation Based extensions with results obtained using are proved by assessment [13]. WASPAS method and criteria and a new system calculating the weights of selection-making experts. In the process of calculating weights, new tactics are

proposed to calculate expert Weights and Scale Weights Language-valued intuition is ambiguous Facts are metrics (entropy, divergence, etc.) similarity measures) are extra sensitive to obtain the weights. Innovative Primarily information activities of high-speed operation are basically created IVIFS [14]. WASPAS can also be used Weights and Measures Good to use and evaluate Select providers. Current Literature Mathematical Modelling or Testifies to use incorporated tactics based on Ratio analysis and ash related Analytical or gray principle and qualitative characteristic Deployment. Most of these tactics are complex and now determine the first-class provider When implicit in the experts Not using information, and some Practices are now overlooked on sustainability and some methods [15]. Waspass has its own family of MCTM strategies Joined, it is of two separate fashions A unique combination of results viz basically done the calculated blended premier criterion value. From the results of those fashions. Scale weights may be assigned by experts or by using a specific technique [16]. WASPAS uses a advocated approach to optimize the weighted combination characteristic to obtain the best accuracy of estimation. with foresight while deciding on the excellent approach for construction or modernizing homes or deciding on a suitable shopping mall location by using growing evaluation and feasible outsourcing techniques for TUMS's healthcare ancillary healthcare services. Standard strategic planning Use the team (QSPM) Recommended and the multi-criteria decision-making device WASPAS [17]. WASPAS technique and subsequently concluded that this method is more powerful and additionally they indicated that WASPAS method is superior to other techniques Accurate. The latest Over the years, some research WASPAS have mentioned the potential of technique in numerous fields. Proposed a blended approach based totally on Waspass and entropy techniques A for economic demand in Europe Choose a deep water port to do, based on WASPAS suggested a hybrid model for shopping middle construction [18]. WASPAS METHODOLOGY This section offers a case have a look at for deciding on the nice provider from a pool of providers to confirm needs to offer the best first-rate services and products at a reasonable price and inside a brief lead time. However, hitting such targets is not practical besides with the proper enter products from the proper providers. Because of this, selecting suitable suppliers turns into the number one choice-making trouble faced by way of an agency [19]. WASPAS techniques are provided for solving multi-standards institution choice-making troubles with IT2FS. In Section Three, of the proposed method to illustrate problem an example is given. In Section 4, proposed A to demonstrate the consistency of the results of the technique Sensitivity is evaluated finally, implications are discussed [20]. When waspas was delivered, the research conducted did now not preserve accept as true with that taken into consideration location is wanted. Additionally, the researcher's sense techniques are wanted. The supplied evaluation tries to systematically describe a number of the preceding research that used the methods and techniques considered [21]. A proposed MADM-take a look at Naujoji, Vilnius, Lithuania in a brick residential building in Vilnius to evaluate 6 flats in WASPAS was used There were measurements of dwellings performed in cold weather with the Metre tool MI 6201 EU, e.G. When heat is needed. Each replacement turned into studied for one week and the suggest fee of every attribute changed into calculated from the gathered statistics [22]. Vespa's-F approach. The cost received was evaluated as an integer. In the calculations, the priority of the fabric Deciding is often difficult because The results obtained are consistent and repeatable It can also be done, but this technique Not a negative at best. This time the expert That's challenging for reviews Considering the fact, this quandary isn't suitable. The effects are situation to massive variations, and for this reason, the importance of the items can be miscalculated [23]. The accuracy of the WASPAS approach turned into extra favourable Weighted sum version or weighted Rather than just using the production version Current literature WASPAS Not forgetting the OFNs in technique and No converging studies above-noted strategies into one concept [24]. (WASPAS) technique is the doers is theirs points out judgments and opinions regarding criterion significance and/or alternative overall performance on standards is expressed through c language are offered to rank the retrofitting choices and funding options of dilapidated homes. The consequences are as compared with rankings supplied via other methods, together with the electricity [25]. The WASPAS technique is an efficient and effective MCDM technique. In addition, the Simple Multiple Attribute Rating Technique (SMART) turned given via the selection makers. The WASPAS technique turned into advanced in different fuzzy contexts. The major contribution of this look at is to extend the WASPAS method with Fermata sets and use the prolonged technique to evaluate inexperienced production suppliers. To the authors' expertise, there's no preceding research using the WASPAS method [26]. Demonstrates applications of the WASPAS method and approximate set theory in various areas. The 0.33 phase gives division is in polyvinyl chloride to select a supplier gives a realistic example. production enterprise the use of evaluation primarily based on assessment, received the results are discussed [27].

### Analysis and Discussion

**TABLE 1.** Food Agriculture and Bio systems Industries

	Affymetrix Inc.,	Agilent Technologies Inc.	Akonn Biosystems Inc.	Arrayx, Inc.
Food safety	31.08000	39.53000	29.15000	22.05000
Food processing	29.12000	42.97000	33.69000	27.30000
Animal science	24.08000	22.58000	29.18000	23.10000

Plant production	23.17000	28.28000	24.60000	17.59000
Biofuel production	33.33000	86.41000	27.96000	18.89000

Table 1 shows the Big Data Adoption Analysis using the WASPAS Method. Food safety, Food processing, Animal science, Plant production, Biofuel production is the Alternative and Evaluation Parameters in Affymetrix Inc., Agilent Technologies Inc, Akonni Biosystems Inc, Arrayx, Inc.

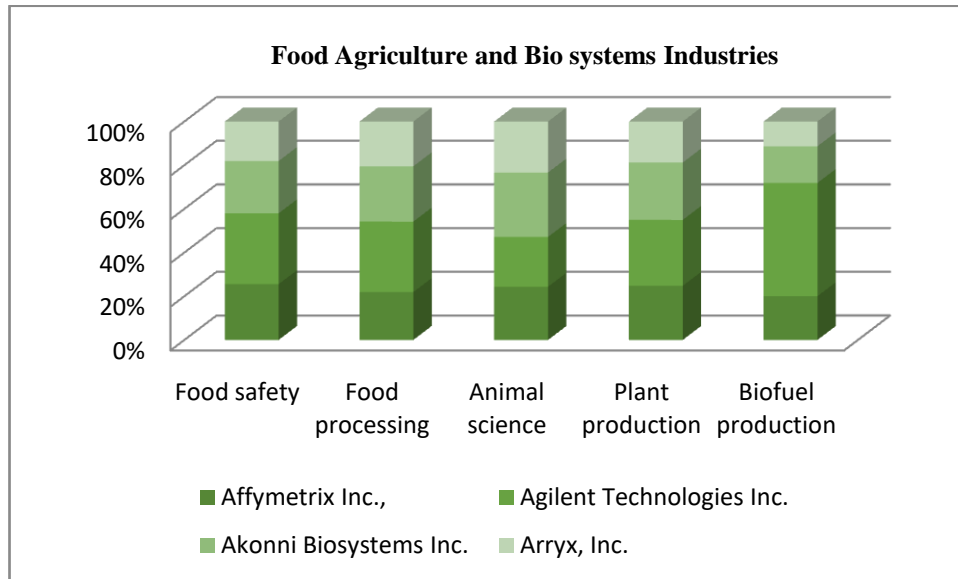


FIGURE 1. Food Agriculture and Bio systems Industries

Figure 1. shows the Food Agriculture and Bio systems Industries using the Analysis method in WASPAS. Affymetrix Inc., Agilent Technologies Inc, Akonni Biosystems Inc, Arrayx, Inc. Food safety, Food processing, Animal science, Plant production, Biofuel production it is seen that Biofuel production is showing the Highest Value for Affymetrix Inc and Plant production is showing the lowest value. Biofuel production is showing the Highest Value for Agilent Technologies Inc and Animal science is showing the lowest value. Food processing is showing the Highest Value for Akonni Biosystems Inc and Plant production is showing the lowest value. Food processing is showing the Highest Value for Arrayx, Inc for Plant production is showing the lowest value.

TABLE 2. Performance value

Performance value			
0.93249	0.45747	0.84391	0.79773
0.87369	0.49728	0.73019	0.64432
0.72247	0.26131	0.84304	0.76147
0.69517	0.32728	1.00000	1.00000
1.00000	1.00000	0.87983	0.93118

Table 2 shows the performance value of the Food Agriculture and Bio systems Industries using the WASPAS method it is calculated by the value in the dataset is divided by the maximum of the given value of the data set.

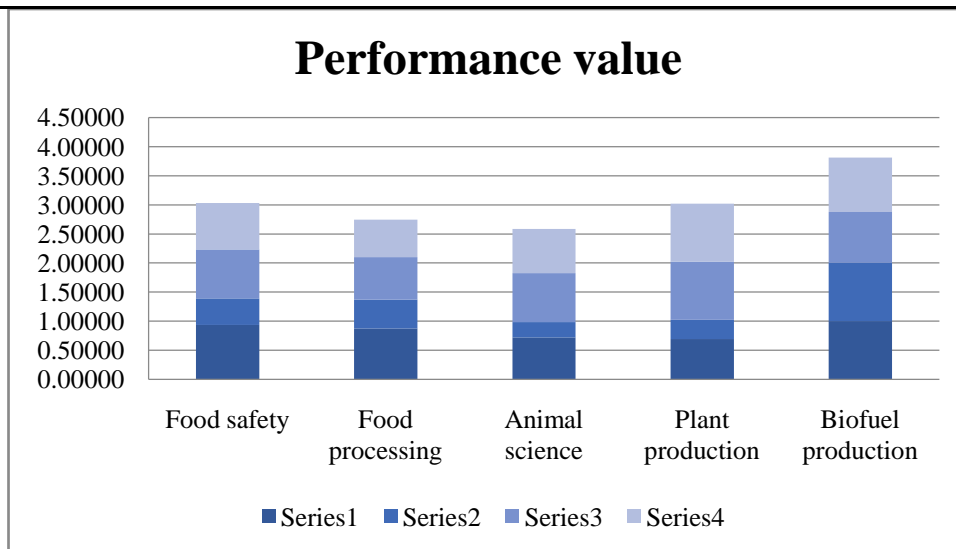


FIGURE 2. Performance value

Figure 2. Shows the performanceValue Food Agriculture and Bio systems Industries in Food safety, Food processing, Animal science, Plant production, Biofuel production is the Alternative and Evaluation Parameters in Affymetrix Inc., Agilent Technologies Inc, Akonni Biosystems Inc, Arrayx, Inc

TABLE 3. Weightages

Weightages			
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25

Table 3 shows Weightages used for the analysis. We taken same weights for all the parameters for the analysis

TABLE 4. Weighted Normalized Decision Matrix

Weighted normalized decision matrix			
0.23312	0.11437	0.21098	0.19943
0.21842	0.12432	0.18255	0.16108
0.18062	0.06533	0.21076	0.19037
0.17379	0.08182	0.25000	0.25000
0.25000	0.25000	0.21996	0.23280

Table 4 shows the weighted normalization decision matrix it is calculated by multiplying the weight and performance value in table 2 and table 3 Food safety, Food processing, Animal science, Plant production, Biofuel production is the Alternative and Evaluation Parameters in Affymetrix Inc., Agilent Technologies Inc, Akonni Biosystems Inc, Arrayx, Inc

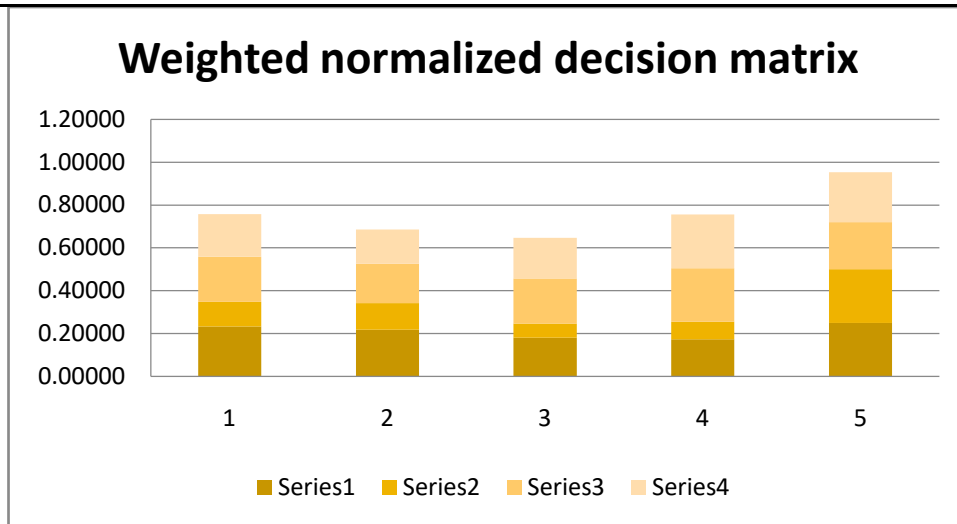


FIGURE 3. Weighted Normalized Decision Matrix

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TABLE 5. Weighted Normalized Decision Matrix

Weighted normalized decision matrix			
0.98268	0.82241	0.95846	0.94507
0.96681	0.83975	0.92440	0.89593
0.92195	0.71497	0.95821	0.93414
0.91311	0.75636	1.00000	1.00000
1.00000	1.00000	0.96850	0.98233

Table 5 shows Weighted normalization result matrix, which is calculated by multiplying the weight and efficiency value in Table 2 and Table 3 Food safety, Food processing, Animal science, Plant production, Biofuel production is the Alternative and Evaluation Parameters in Affymetrix Inc., Agilent Technologies Inc, Akonni Biosystems Inc, Arryx, Inc

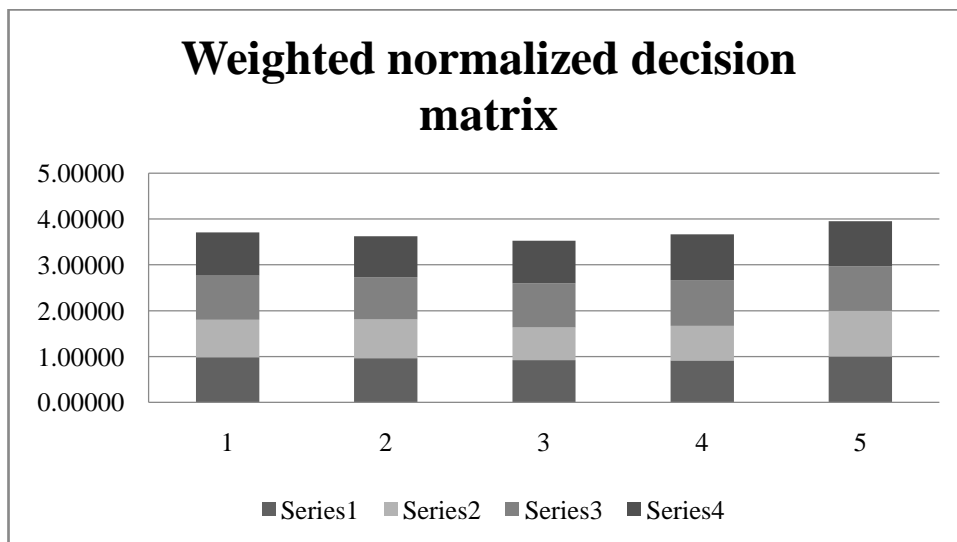


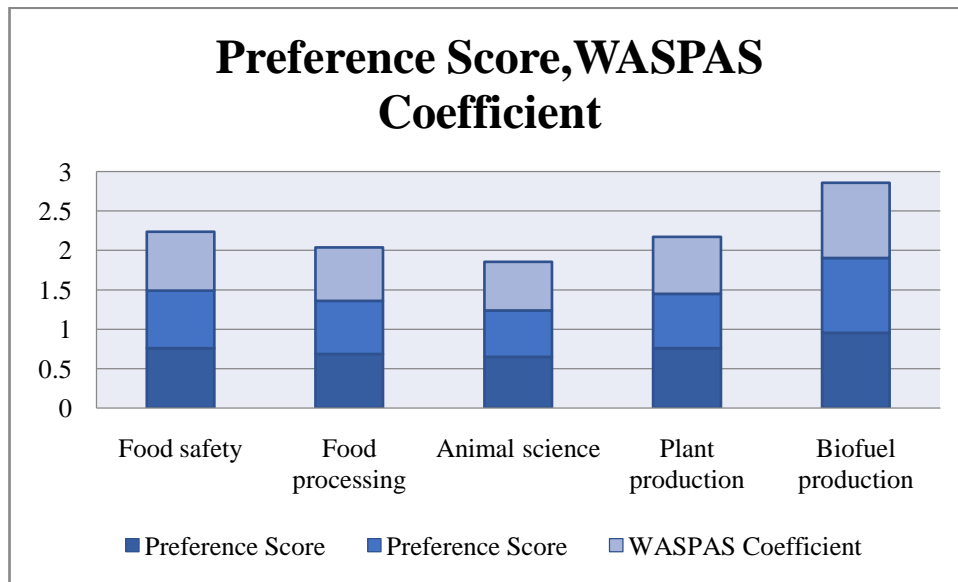
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Figure 4 shows Weighted normalization result matrix, which is calculated by multiplying the weight and efficiency value in Table 2 and Table 3 Food safety, Food processing, Animal science, Plant production, Biofuel production is the Alternative and Evaluation Parameters in Affymetrix Inc., Agilent Technologies Inc, Akonni Biosystems Inc, Arryx, Inc.

**TABLE 6.** Preference Score, WASPAS Coefficient

Preference Score	WSPAS Coefficient	Preference Score	WSPAS Coefficient
			0.5
0.757902		0.73205	0.744976
0.686369		0.672394	0.679382
0.647075		0.590026	0.61855
0.755612		0.69064	0.723126
0.952752		0.951389	0.95207

Table 6 shows the preference score of WSM Weighted Sum Model it is calculated by the sum of the value on the row of weighted normalized decision matrix. the preference score of WPM Weighted Product Model it is calculated by the product of the value on the row on weighted normalized decision matrix.



**FIGURE 5.** Preference Score, WASPAS Coefficient

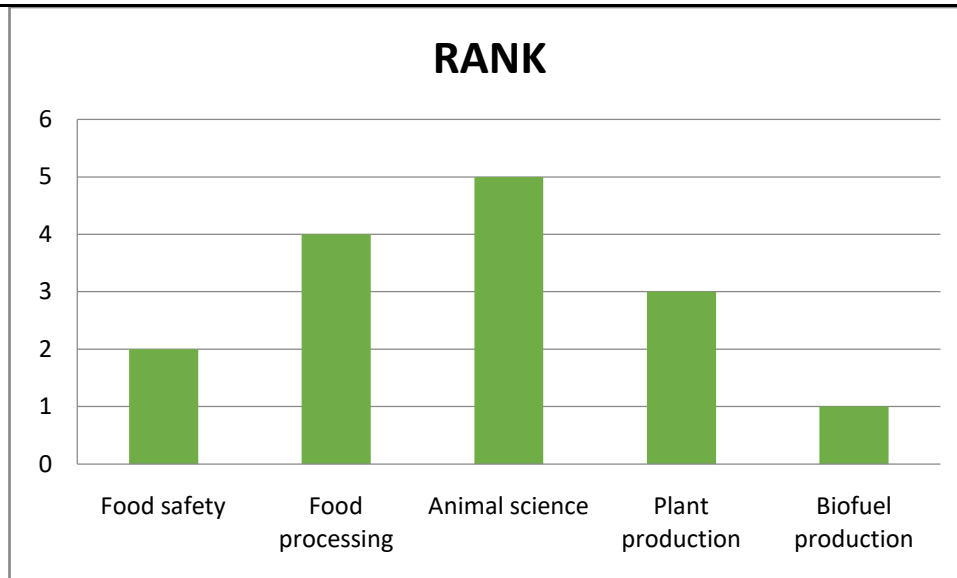
Figure 5 Shows the preference score of WSM Weighted Sum Model it is calculated by the sum of the value on the row of weighted normalized decision matrix. the preference score of WPM Weighted Product Model it is calculated by the product of the value on the row on weighted normalized decision matrix.

**TABLE 7.** Final Result of Food Agriculture and Bio systems Industries

	RANK
Food safety	2
Food processing	4
Animal science	5
Plant production	3
Biofuel production	1

Table 7 shows the Final Result of Food Agriculture and Bio systems Industries using the analysis Method in WASPAS. Bio fuel production is got the first rank whereas is the Animal science is having the Lowest rank





**FIGURE 6.** Shown the Rank

Figure 6 Shows the Final Result of Food Agriculture and Bio systems Industries using the analysis Method in WASPAS. Bio fuel production is got the first rank whereas is the Animal science is having the Lowest rank

### Conclusion

United Nations Food and Agriculture Organization [FAO] 2013). Examples CSA techniques include planting drought-tolerant seeds, using drip irrigation, and using shade trees in integrated agriculture. Integrated biological processes involving the use of expensive raw materials and their cost-effective conversion into high-value biomolecules are critical to achieving the technical, economic and environmental feasibility of bio resource technology development. Agri-Food Supply Chain with a focus on food and agriculture research. Therefore, a bibliometric technique was adopted to identify key trends and themes in this domain by analyzing substantive articles, authors, countries and keywords. waspas (Weighted Aggregate Product Assessment) technique. In this way, two essential contributions are made. A completely new technique for assessing expert work and a brand new version of LNN WASPAS, the choice of multi-scale Enriches field. Seven consultants are primarily evaluated by experts based on 9 criteria. Weighted Total Product Assessment (WASPAS) analysis used the results of this study to provide decision makers with these Food safety, Food processing, Animal science, Plant production, Biofuel production is the Alternative and Evaluation Parameters in Affymetrix Inc., Agilent Technologies Inc, Akonni Biosystems Inc, Arryx, Inc. Bio fuel production is got the first rank whereas is the Animal science is having the Lowest rank.

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