



A Systematic Literature Review of Key Performance Indicators (KPIs) Implementation

Indra Setiawan¹, Humiras Hardi Purba²

^{1,2} *Industrial Engineering Department, Mercu Buana University
Jln. Meruya Selatan No.1 Kembangan Jakarta 11650, Indonesia*

¹indra.setiawan.2022@gmail.com

²humiras.hardi@mercubuana.ac.id

Abstract - Management performance measurement based on Key Performance Indicators (KPIs) has been widely applied in any organization. This paper aims to identify Key Performance Indicators (KPIs) and classify them based on performance measurements to improve optimal management organizational performance. This research is based on a literature review of 50 journals based on performance management with the weight of Key Performance Indicators (KPIs) for the years 2011-2020. Performance measurement using this Key Performance Indicator can be implemented in many institutional organizations such as industry company sector, services, academics, hospitals, and government. KPIs can change behavior in an organization and provide results in broad contexts such as improving business results or driving improved operational performance. KPIs also help in implementing performance measurement on an ongoing basis. So that KPIs become a better way of managing the organization.

Keywords — Key Performance Indicators, Performance Measurement, KPIs

I. INTRODUCTION

Currently, research on Human Resources development is being improved. Therefore, each agency has a special agency or field that deals with Human Resources issues. An example is a company that is developing, so as not to be left behind, it is necessary to apply management that focuses on research on the quality of Human Resources. Thus a company with a quick strategy can build its Human Resources development company. This makes the company not always focus on product development or marketing improvement alone. However, companies must also start improving the quality of their Human Resources. Key Performance Indicators (KPIs) help define and measure organizational goals, which are fundamental to any ongoing organization and the success/ sustainability of any company. KPIs are very important for companies that are implementing a performance management system based on a measurable perspective of organizational functions. In its implementation, KPIs are often integrated with the Balanced Scorecard, because this approach is the most popularly used. Also besides, other integrations are widely implemented, such as Performance Prism, IPMS, DEMATEL, and others. While KPIs help organizations avoid abnormalities in measurement, usually in the application of measuring KPIs with multiple integrations, the aggregation is random, so that it becomes complex.

Key Performance Indicators (KPIs) is a management tool or instrument so that an activity or process can be followed, controlled (if it deviates, can be recognized for correction), and ensured to achieve the desired performance. One way to achieve good indicators in employee performance appraisal is by using the KPIs method. KPIs compare what has been created with what has been defined. Successful implementation will depend on implementing a good maintenance strategy in accordance with what has been determined [1]. Key Performance Indicators (KPIs) is a series of key indicators that are measurable and provide information on the extent to which strategic objectives are assigned to an organization in achieving success The elements contained in KPI consist of strategic objectives, key indicators relevant to these strategic goals, objectives which is the benchmark and time frame or period of the KPIs [1]

KPIs are one of several main tools in organizational management, KPIs are formed with the following objectives: 1) Connecting the values of the vision and mission, organizational strategy, and organizational performance targets through organizational activities to achieve expected performance targets, 2) To measure the performance of the organization and / or company divisions whether there is a significant increase or decrease, 3) Comparing the current performance of the organization with past organizational performance, or



making comparisons with the performance of other organizations so that the current organization gets a framework about the strengths or weaknesses of the organization compared to competitors, and gets the opportunity to create added value, 4) Organizational KPIs are used as the basis for determining indicators or work targets of divisions or individuals, 5) The results of the achievement of KPIs can be used as a reference for giving rewards and consequences so that KPIs also have the benefit of encouraging employee work motivation and good behavior from employees.

II. METHOD

This paper aims to explore more deeply the implementation of Key Performance Indicators in organizations. This paper aims to elaborate on the knowledge of Key Performance Indicators, consider Key Performance Indicators as an organizational strategy for measuring HR performance, and seek ways to gain more insight into Key Performance Indicators.

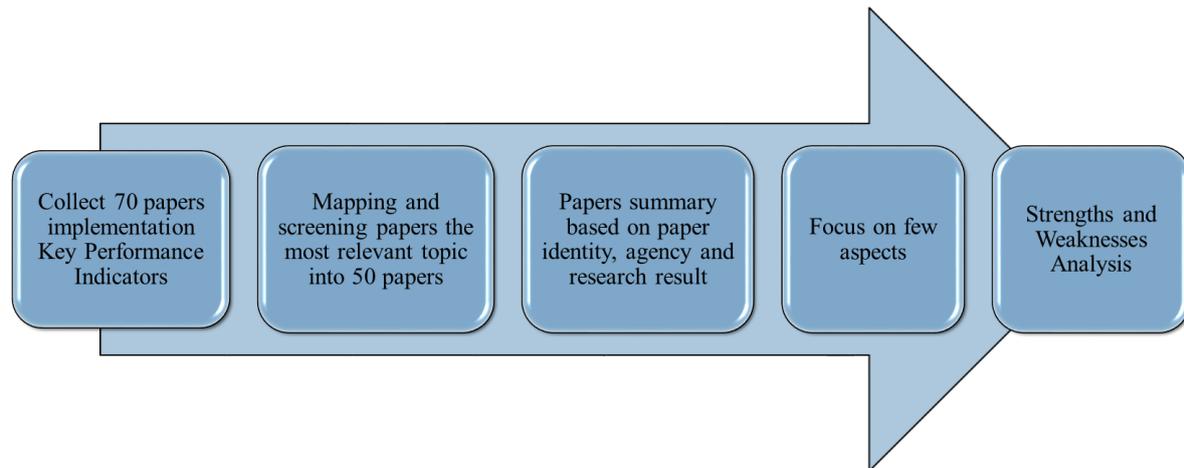


Figure 1. Literature Study Framework

The method used is a systematic literature review to identify and classify several research results on Key Performance Indicators. The research flow begins with the determination of one topic, namely Key Performance Indicators. The topic was determined because it describes a performance improvement implemented by organizations in various agencies. Key Performance Indicators are known as a method that can solve organizational management problems, so they will continue to be needed and applied to organizations in various agencies. Several studies that have been conducted related to Key Performance Indicators were collected and identified based on paper identity, agency and research results. The summary of the identification results is made systematically through mapping according to a systematic mapping study system. Based on the mapping made, it can form a cluster and classification, so that the information obtained is easier to understand. This method will be useful for deepening knowledge about the implementation of Key Performances Indicators and knowing the trend of problems related to organizational performance, knowing the results of research and developments in the application of KPIs in various agencies. This literature review can combine various information regarding KPIs and improve system performance optimally. For more details, the Framework for Literary Studies in this paper can be seen in Figure 1

III. RESULT AND DISCUSSION

Table 1. An existing literature review of Key Performance Indicators-KPIs

No	Paper Identity	Agency	Result
1	[2]	Construction	Development coordination performance indicators (KPIs) and critical indicator factors in construction projects
2	[3]	Dealer	Explanation of organizational processes, how to select KPIs, and practical examples of KPIs measurements at Toyota dealers
3	[4]	E-Commerce	The indicator that affects sales is the internet environment (46.2%) and customers (20.3%).
4	[5]	Education	The number of efficient DMUs decreases from 5 for the base case to 1, 3, 4, or 2 for the case of interesting indicators I1, I2, O1, or O2 respectively



5	[6]	E-Commerce	The results showed that the average KPIs value reached 7 with a quartile deviation of 0.6
6	[7]	Textile Industry	The new strategy that the company must undertake is a diversification strategy, which is an effort to find and develop new products or markets
7	[8]	Finance Company	The Information system development department can supervise and develop its performance in a more directed manner
8	[9]	Education	Prototype performance dashboard. The dashboard is developed based on the KPIs contained in the evaluation guide self
9	[10]	Manufacturing	Maintain 3 aspects namely financial, customer and internal processes as well as improve learning and growth aspects
10	[11]	Manufacturing	Manufacturing organizations focus more on customer satisfaction and delivery reliability in terms of performance measurements
11	[12]	Hospital	Four key performance indicators can help provides a framework for measuring portable performance radiography
12	[13]	Education	Key Performance Indicators (KPIs) are designed to look at key challenges, performance, and differences in CDM.
13	[14]	Manufacturing	Produce 3 priority criteria which must be reported monthly between manufacturing, finance and administration divisions.
14	[15]	Oil Industry	The performance measurement results show that at the green level with a performance result of 98% or already good
15	[16]	Manufacturing	Introducing selected KPIs and formulating new KPIs specifically designed for remanufacturing
16	[17]	Government	The HR indicator is the most important indicator in assessing the performance of lamp maintenance with a weight of 0.095
17	[18]	Government	The results of the KPIs development show that government agencies have eight strategic objectives and five KPIs
18	[19]	Manufacturing	Overall Equipment Effectiveness is used in both disciplines and runtime KPIs are critical in MP&C
19	[20]	Manufacturing	The KPIs system is able to manage indicators for employee performance appraisal references so that errors can be minimized
20	[21]	Education	To measure the performance of lecturers, the teaching aspect is the aspect with the highest value
21	[22]	Construction	KPIs are important in a project and play an important role in decision making also involve risks in a project risk
22	[23]	Survey	Key Performance Indicators (KPIs) as a source of knowledge and exploration of the best ways to reach the organization.
23	[24]	Manufacturing	Hierarchical structure is useful for engineers and manufacturer managers to measure, analyze, and utilize KPIs for CIS
24	[25]	Manufacturing	The main benefit of the proposed solution is to increase the management effectiveness of the MTO manufacturing company
25	[26]	Manufacturing	There are 36 KPIs adapted to the performance measurement approach with the SCOR method
26	[27]	Manufacturing	There are 14 KPIs for targeting resources in improving KPIs and overall organizational performance.
27	[28]	Fertilzer Industry	There are 14 KPIs with categories according to company expectations, 20 KPIs in the moderate category and 6 KPIs in the very low or poor category.
28	[29]	Construction	KPIs to measure competitive priority quality, cost, delivery and flexibility
29	[30]	Manufacturing	KPIs can be used as an effective performance measurement tool for managers in providing annual performance assessments for all engineers



30	[31]	Manufacturing	The previous work appraisal system used a simple form, now uses a system, namely through the KPIs system
31	[32]	Service	The company's performance at the business unit level is 56.25% and the business process unit level is below 60.25%
32	[33]	Manufacturing	Three groups were defined and constructed hierarchy including objectives, factors, and indicators. Three factors, namely environmental, economic and social.
33	[34]	Manufacturing	85% of employees said they were satisfied with the new system and 15% preferred the old system
34	[35]	Manufacturing	There are 21 Key Performance Indicators (KPIs), with fire safety being the most relevant KPI
35	[36]	Manufacturing	There are 20 KPIs that pass the validation test and are weighted using AHP. The high weight is the perspective of the customer indicator, namely 0.426
36	[37]	Government	Determination of Key Performance Indicators for monitoring dashboard model of procurement of goods in government
37	[38]	Manufacturing	Presents a procedure for individual manufacturers to select KPIs to measure, monitor, and improve the environmental aspects of the manufacturing process
38	[39]	Government	KPIs can be used as a basis for decision making related to HR development.
39	[40]	Service	There are 23 KPIs, 9 KPIs are in the red zone, 10 are in the yellow zone and the rest are in the green zone.
40	[41]	Manufacturing	Framework with KPIs to measure and improve productivity and product quality across products development process
41	[42]	Manufacturing	KPIs framework for regulating KPIs in process industries
42	[43]	Manufacturing	Key Performance Indicator which has the highest weight at level 3 is warranty and return with a weight of 0.368
43	[44]	Manufacturing	Performance measurement for the food industry contains a customer perspective, financial perspective, internal process perspective, learning and growth perspective, and food quality perspective.
44	[45]	Education	The average value of all performance evaluation components is 0.616 and it is said that the performance of the PS lecturers is at a good level
45	[46]	Manufacturing	Market KPIs, sales and marketing to identify the market and sales potential of additive manufacturing technologies
46	[47]	Manufacturing	There are 45 KPIs indicators and a work assessment system with sheets
47	[48]	Hospital	The model proposed can help managers to determine a limited number of important indicators for monitoring and managing hospital performance
48	[49]	Sosial Institution	Penalties given to employees can provide significant changes to the achievement of the KPIs value
49	[50]	Manufacturing	KPIs found that the productivity of the company was quite low and continued to decline
50	[51]	Education	The 2016-2017 term of service has the highest average percentage of 92% so that KPIs is achieved

Based on Table 1, it shows that this paper describes 50 articles related to the implementation of the Key Performance Indicators and identified based on paper identity, industry focus, and research results.



In this paper, the most dominant articles published by Manufacturing (Figure 2) are traced from publications from 2011-2020 (Figure 3). KPIs is considered as a new initiative in performance measurement. The success of KPIs in various institutions to assess the achievement of activity implementation based on strategic plans so that the progress of the organization can be known and to improve the quality of decision making and accountability. When applied in a hospital, KPIs can assess the performance of X-rays in increasing hospital efficiency by 47%, and increasing radiographer productivity by 96% [12]. In the Government, the determination of key performance indicators for the monitoring dashboard model can help government procurement of goods [37]

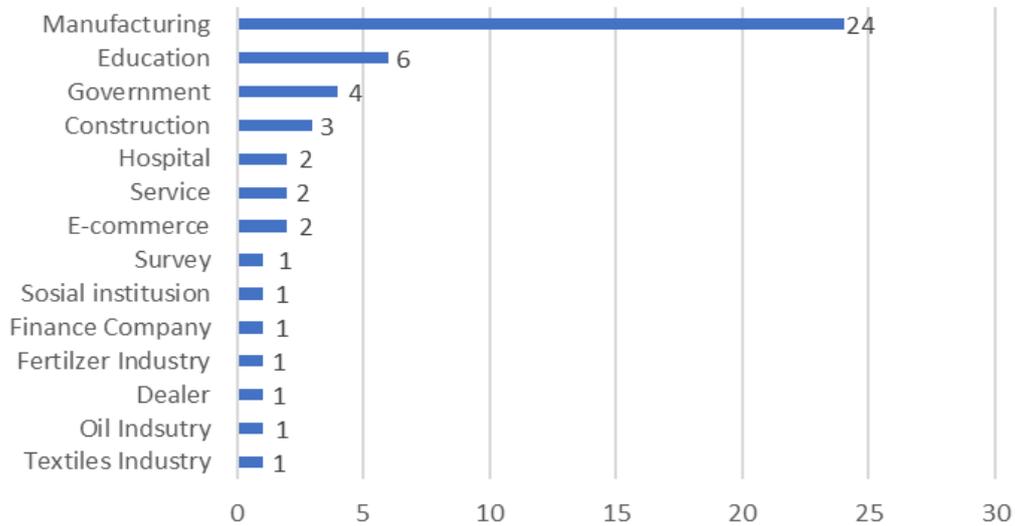


Figure 2. Agency Focus

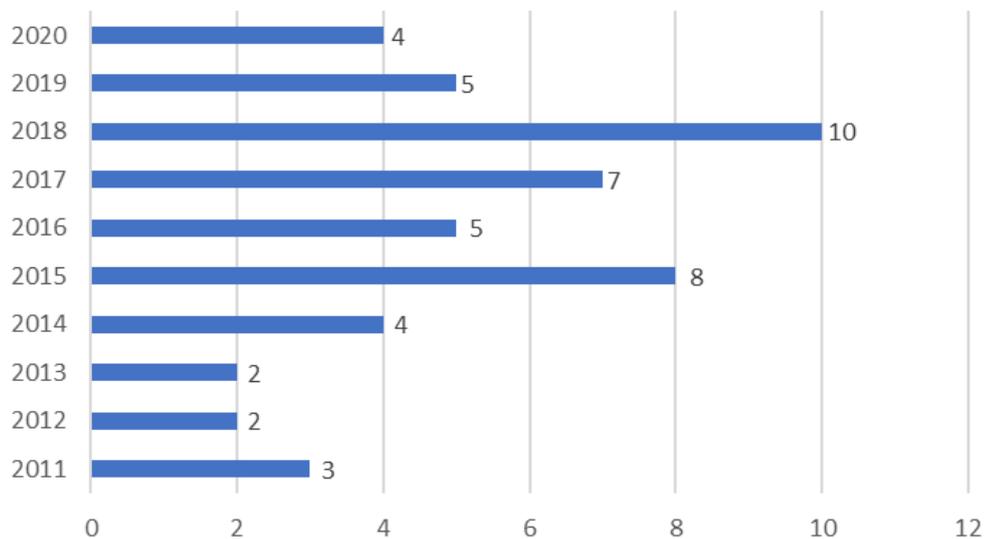


Figure 3. Focus Year of Publication

In the implementation of KPIs, it is often integrated with various kinds of performance measurement methods such as Balanced Scorecard [44] DEMATEL [48], AHP [23], ANP [4], DEA [5], SCOR [26], Performance Prism [28], SMART [32], Decision Analyze [27] and others. For further details, it can be seen in Figure 4

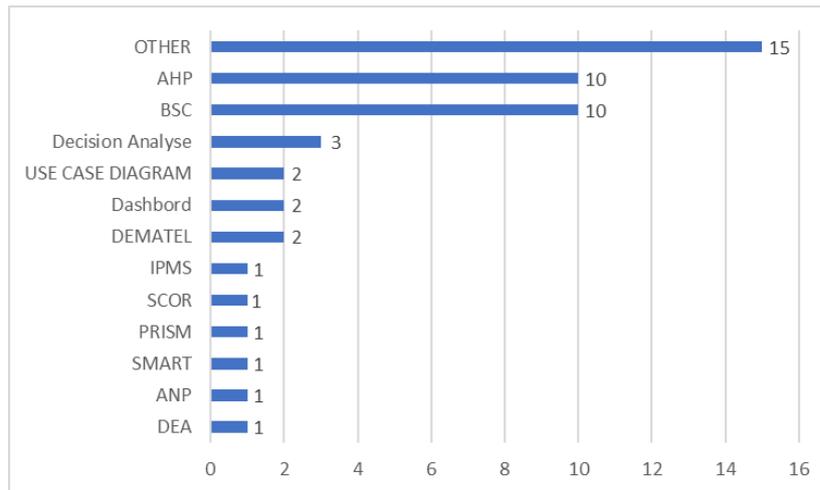


Figure 4. Focus Method Intregation

This paper identifies the distribution of KPIs implementation publications in various agencies based on identified areas (Figure 5). In this paper, the Asia region is the supplier of the most significant number of publications with 38 papers followed by Europe with 7 papers, America 3 papers and Africa 3 papers.

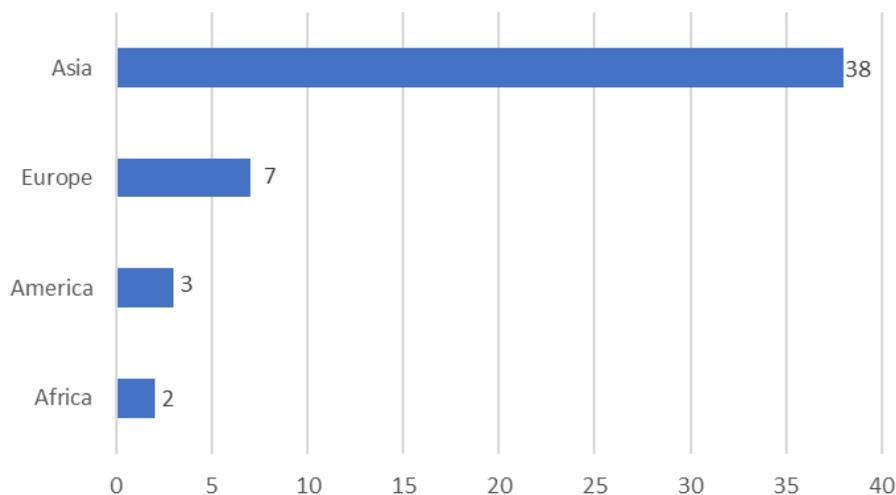


Figure 5. Focus of Publication Region

A. Strengths and Weaknesses Analysis

After identifying the various articles, it can be concluded that the implementation of KPIs provides many benefits to organizations in agencies, namely as follows: 1) It makes it easier for managers to provide rewards and punishments, 2) The direction of employee development is clear and directed, 3) It makes it easier for managers to make decisions, 4) Job appraisal becomes more objective and directed, 5) Increase organizational efficiency, 6) Increase productivity, 7) Improve service, 8) Creating safety indicators.

In addition to the advantages it has, it turns out that the implementation of KPIs has weaknesses. This work appraisal system is less practical because it has to go through a recapitulation process and requires a longer time than direct assessment. The process of monitoring KPIs increases the work of employees because it requires regular recording every day.

B. GAP in Current Research and Agenda for Further Research

In the current trend, KPIs implementation has been mostly done to measure employee performance or management accountability. The opportunity for further research is that KPIs can be used in the implementation of measuring the performance of production machines, measuring production productivity, measuring product

sales, and others. This is a gap in the current implementation of KPIs, so that further researchers can apply it to operational activities in the industry

C. Relationship between KPIs and Industry 4.0

In the era of Industry 4.0, all current operations are IT-based. To manage and cope with significant and radical changes in business processes and activities in the context of Industry 4.0, agencies through organizations need to have fast reactive capabilities. This can be accomplished with a performance measurement system (PMS) that must conform and reflect current digitization and innovative trends. This PMS must be developed and explored due to changes in technology, business environment, and current processes.

Currently, the performance measurement system is being developed towards three main functions of performance measurement systems in the context of Industry 4.0, namely Predictive analytics, Key Performance Indicators (KPIs) and Real-time control and decision making. The more intensive use of predictive methods in the planning process, will help to view real-time data for decision making because of the need for faster control and decision-making processes. In the industrial era of 4.0, in performance measurement, many IT-based technologies are used. An example is the creation of dashboard monitoring as a system capable of recording and managing large amounts of data with the help of trends in the Big Data function. Due to the innovative solutions according to Industry 4.0, companies will be able to collect large amounts of data and different information in one system which can later be used during planning and decision making. It is important to make future research into how performance measurement systems to reflect: business processes and activities that have not been affected by IT-based technology innovation.

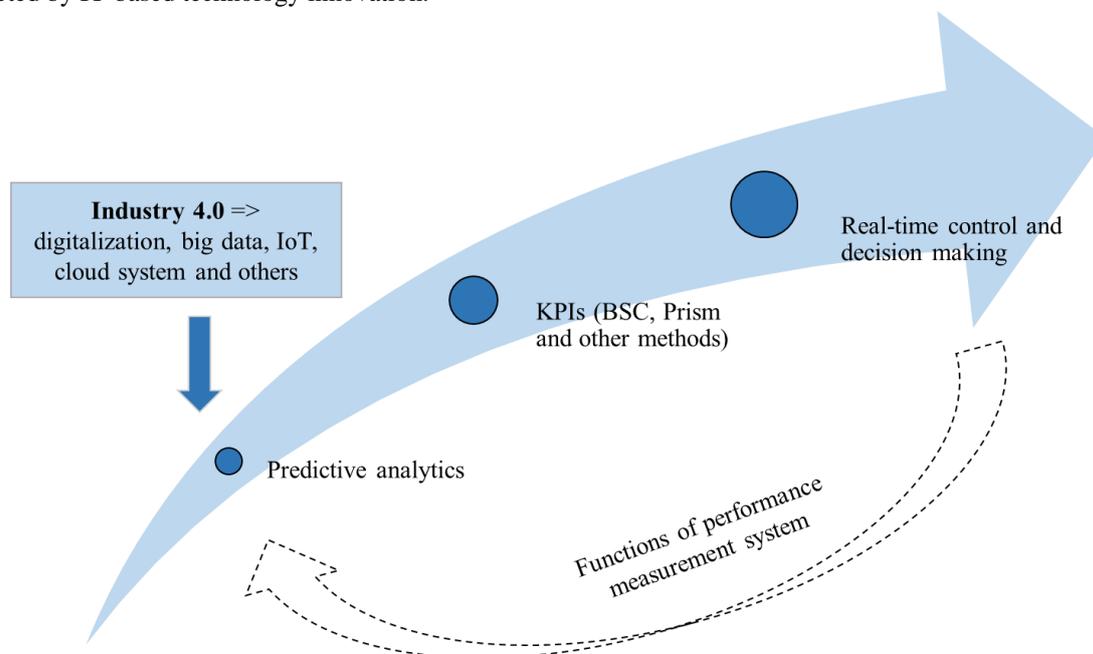


Figure 6. The Framework for Developments KPIs to Industry 4.0

IV. CONCLUSION

The main focus of KPIs as a management system is three things, namely the focus on measuring the performance of human resources, achieving the company's vision and mission and making decisions. The literature on this paper shows that the study focuses on KPIs to improve organizational performance, increase customer satisfaction, improve better service, determine safety indicators, and even monitor system dashboards. Researchers can then apply KPIs in contexts other than HR performance measurements such as machine performance measurement, sales target measurement, and productivity measurement.

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