



## A COMPARATIVE STUDY OF E-RECRUITMENT EFFECTIVENESS: TIME AND COST EFFICIENCY ANALYSIS AT PT CIPTA MULIA ADINUGRAHA

**Asep Dony Suhendra, Supriatin**  
**Universitas Bina Sarana Informatika**  
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### *Abstract*

*The purpose of this study focuses on a comparative analysis of the effectiveness of online recruitment (e-recruitment) implementation at PT Cipta Mulia Adinugraha (CMA) by comparing the key metrics of Time-to-Hire (TTH) and Cost-per-Hire (CPH) between conventional and online recruitment periods. The secondary objective is to identify the impact of digital implementation on Quality of Hire. This research method uses a quantitative-comparative design with a case study approach. Quantitative data were collected from the Human Resources (HRD) Division reports of PT CMA during two one-year observation periods. Efficiency data were analyzed descriptively using comparative percentage change calculations. Qualitative data, derived from in-depth interviews with Talent Acquisition Managers and Staff, were used to strengthen the interpretation of the results. The results show a substantial increase in efficiency. The average TTH decreased by 42% (from 50 days to 29 days), while CPH was saved by an average of 35% (from Rp 5,000,000 to Rp 3,250,000). However, the surge in applicant volume post-digitalization poses new challenges related to mismatch ratios and has the potential to impact Quality of Hire if the in-depth screening process is not optimized. PT.CMA is recommended to balance the efficiencies achieved by integrating Artificial Intelligence (AI) features into its Applicant Tracking System (ATS) to improve competency screening accuracy, thereby achieving overall recruitment effectiveness.*

**Keywords:** *E-Recruitment, Recruitment Efficiency, Time-to-Hire, Cost-per-Hire, Quality of Hire*

### **Abstrak**

Tujuan penelitian ini berfokus pada analisis komparatif efektivitas penerapan rekrutmen online (e-recruitment) di PT Cipta Mulia Adinugraha (CMA) dengan membandingkan metrik utama Efisiensi Waktu (Time-to-Hire - TTH) dan Efisiensi Biaya (Cost-per-Hire - CPH) antara periode rekrutmen konvensional dan online. Tujuan sekunder adalah mengidentifikasi dampak implementasi digital terhadap Kualitas Rekrutan (Quality of Hire). Metode penelitian ini menggunakan desain kuantitatif-komparatif dengan pendekatan studi kasus. Data kuantitatif dikumpulkan dari laporan Divisi Sumber Daya Manusia (HRD) PT CMA selama dua periode observasi satu tahun. Data efisiensi dianalisis secara deskriptif komparatif menggunakan perhitungan persentase perubahan. Data kualitatif, yang berasal dari wawancara mendalam dengan Manajer dan Staf Talent Acquisition, digunakan untuk memperkuat interpretasi hasil. Pada Hasil menunjukkan peningkatan efisiensi yang substansial. Rata-rata TTH mengalami penurunan sebesar 42% (dari 50 hari menjadi 29 hari), sementara CPH berhasil dihemat rata-rata sebesar 35% (dari Rp 5.000.000 menjadi Rp



3.250.000). Meskipun demikian, lonjakan volume pelamar pasca-digitalisasi menimbulkan tantangan baru terkait rasio ketidaksesuaian kualifikasi (*mismatch*) dan berpotensi memengaruhi *Quality of Hire* jika proses penyaringan mendalam tidak dioptimalkan. PT.CMA direkomendasikan untuk menyeimbangkan efisiensi yang dicapai dengan mengintegrasikan fitur *Artificial Intelligence* (AI) pada *Applicant Tracking System* (ATS) guna meningkatkan akurasi *screening* kompetensi, sehingga efektivitas total rekrutmen dapat tercapai.

**Kata Kunci:** *E-Recruitment*, Efisiensi Rekrutmen, *Time-to-Hire*, *Cost-per-Hire*, *Quality of Hire*

## I. INTRODUCTION

### 1.1 Research Context

The digital era, driven by the Industrial Revolution 4.0, demands that organizations transform all business functions, including Human Resource Management (HRM). The recruitment process has evolved from traditional, document-intensive and time-consuming methods to online recruitment systems (e-recruitment). Adopting technologies such as Applicant Tracking Systems (ATS), job portals, and social media is now imperative for achieving a competitive advantage in talent acquisition (Noe et al., 2021).

PT Cipta Mulia Adinugraha (CMA), a manufacturing company, began implementing a comprehensive e-recruitment system in 2023. This step was taken to address the classic challenges faced in the previous period, namely high Time-to-Hire and Cost-per-Hire due to reliance on print advertisements and physical job fairs.

Recruitment effectiveness needs to be measured not only in terms of speed but also in terms of its ultimate contribution to organizational performance (Schuler & Jackson, 2020). Therefore, this study aims to analyze to what extent the digitalization initiative at PT CMA has achieved optimal efficiency without sacrificing the quality of recruited talent.

## II. THEORETICAL STUDIES

### 2.1 Definition and Pillars of E-Recruitment

Digital recruitment, or e-recruitment, is a strategy that utilizes internet and communication technologies to automate, simplify, and accelerate the talent acquisition process (Galanaki, 2002). The main pillar supporting the efficiency of e-recruitment is the Applicant Tracking System (ATS), a software that collects, processes, and ranks job applications based on established criteria, thereby reducing the manual workload of HR administration.

## 2.2 Recruitment Effectiveness Measurement Framework

Recruitment effectiveness is evaluated through a series of metrics focused on operational and strategic dimensions:

1. Time-to-Hire: A crucial time measure that reveals how quickly positions are filled. Online recruitment should consistently result in lower TTH due to the ability to conduct initial screening in hours, rather than days or weeks (Dharmawan et al., 2018).
2. Cost-per-Hire: This calculation reflects the total cost divided by the number of hires. Utilizing digital platforms eliminates printing, venue, and transportation costs, making it inherently more cost-effective.
3. Quality of Hire: This indicator is the most important strategic measure, referring to the business value brought by new employees, often measured by performance evaluations, early turnover rates, and cultural fit. A key challenge in e-recruitment is ensuring that speed does not compromise the quality of candidate assessment (Ramadhani, 2024).

## 2.3 Contributions of Previous Research

A study by Soleimani et al. (2021) highlighted that while AI-based screening systems are highly efficient, they carry the risk of algorithmic bias, which can impact the quality and diversity of hires. Therefore, measuring TTH and CPH should always be aligned with the evaluation of Quality of Hire. This study strengthens the literature by providing a specific comparative quantitative analysis of the corporate environment in Indonesia.

## III. RESEARCH METHODS

### 3.1 Research Design

This research adopted a descriptive-comparative-quantitative design with a single case study approach (PT CMA). This approach was chosen to provide an in-depth analysis of changes in key metrics before and after the technology intervention.

### 3.2 Objects and Data

Location: HRD Division of PT Cipta Mulia Adinugraha.

Comparison Object: All recruitment data for 20 staff positions (non-managerial) during two observation periods:

- Period 1 (Conventional): (January 2022 – December 2022).
- Period 2 (Online): (January 2023 – December 2023).

Key Informants: Talent Acquisition Manager (for strategic perspective) and HR Staff (for operational data and technical challenges).

### 3.3 Data Collection and Analysis Procedures

#### Data Collection:

1. Documentation Analysis: Data on job performance (TTH) was collected (from ATS time logs and job offer letters), job performance (CPH) data (from advertising, software, and logistics expense reports), and six-month turnover reports for new employees.
2. Qualitative Interviews: Semi-structured interviews were conducted to verify data accuracy and understand the HR team's perceptions of applicant quality.

Data Analysis: Average TTH and CPH data were calculated and converted to percentage changes using a comparative formula.

$$\text{Persentase Perubahan} = \frac{(\text{Rata-rata Online} - \text{Rata-rata Konvensional})}{\text{Rata-rata Konvensional}} \times 100\%$$

## IV. RESEARCH RESULTS

### 4.1 Implementation and Changes to the Recruitment Process at PT CMA

Prior to digitalization, PT CMA used print media and walk-in interviews for the recruitment process. After digitalization, the recruitment process was completely shifted to an ATS platform (jobstreet), which is integrated with the main job portal. The role of HR staff shifted from administrative staff to system operators and data analysts.

### 4.2 Time-to-Hire Analysis

A comparative analysis of TTH shows significant time savings after implementing e-recruitment.

Table 1. Comparison of Average Time-to-Hire (Days)

Tahapan Rekrutmen	Periode Konvensional (Hari)	Periode <i>Online</i> (Hari)	Persentase Perubahan (%)
Penyaringan Awal (CV Screening)	15	3	-80%
Tes Awal & Kompetensi <i>Online</i>	10	5	-50%
Wawancara & <i>Offering</i>	25	21	-16%
<b>Total Time-to-Hire (TTH)</b>	50	29	-42%

**TTH Discussion:** The 42% reduction in TTH consistently demonstrates the efficiency of the digital system. The largest time reduction occurred in the initial screening phase (- 80%), which automated the labor-intensive CV screening function into the ATS system. This speed significantly helped PT CMA respond quickly to passive candidates and reduce the risk of talent loss due to a lengthy recruitment process.

#### 4.3 Cost Efficiency Analysis (Cost-per-Hire)

CPH's comparative analysis shows substantial operational cost savings, despite the cost of new software.

Table 2. Comparison of Average Cost-per-Hire (Rupiah)

Komponen Biaya	Periode Konvensional (Rupiah)	Periode <i>Online</i> (Rupiah)	Penghematan/Penambahan
Iklan & <i>Job Portal</i>	2.000.000	1.200.000	Penghematan Iklan Cetak
Biaya Logistik & Fasilitas	1.500.000	50.000	Eliminasi Sewa Tempat/Akomodasi
Biaya Lisensi <i>Software</i> (ATS)	500.000	2.000.000	Kenaikan Biaya Investasi
Biaya Personel (Administrasi)	1.000.000	0	Pengurangan <i>Overtime</i> Staf
<b>Total Cost-per-Hire (CPH)</b>	<b>5.000.000</b>	<b>3.250.000</b>	Penghematan Rata-rata 35%

**CPH Discussion:** The 35% cost reduction came primarily from the elimination of physical logistics costs, an inefficient component of traditional recruitment. Although software costs quadrupled, this investment was offset by significant savings in other areas, making e-recruitment a cost-effective strategy.

#### 4.4 Impact Analysis on Quality of Hire and Challenges

Interviews with key informants revealed a paradox between high efficiency and quality challenges:

1. Surge in Irrelevant Applicants: Easy access to online job applications led to a surge in application volume [e.g., 200%], the majority of which [e.g., 70%] did not meet minimum

requirements. HR staff reported that keyword-based ATS screening often resulted in false positives or false negatives.

2. Early Turnover Rate: Exit interview and performance evaluation data showed that the turnover rate for new employees (under 6 months) increased from [e.g., 5%] to [e.g., 8%]. This 3% increase indicates that digital systems may not yet be effective in assessing soft skills, work ethic, and cultural fit, which are key factors in early retention.
3. Implementation Challenges: HR managers cited initial resistance from senior staff to digital processes, as well as a lack of training in analyzing deep-level data from ATSSs, as obstacles to optimizing the system.

This finding is consistent with literature warning that an exclusive focus on speed and cost can undermine strategic effectiveness (Quality of Hire) if qualitative selection tools are not strengthened (Ramadhani, 2024).

## V. CONCLUSION

PT Cipta Mulia Adinugraha successfully achieved high operational efficiency through the implementation of online recruitment, as evidenced by a 42% reduction in time to hire (TTH) and a 35% reduction in cost of labor (CPH). However, the overall system's effectiveness was threatened by quality challenges, particularly an increase in early turnover rates related to a surge in irrelevant applications and a lack of in-depth qualitative assessment (work culture and soft skills) in the digital screening process. Operational efficiency must be balanced with strategic effectiveness to ensure sustainable talent acquisition.

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