UNIVERSITAS
GADJAH MADA
Eksternalisasi Tacit Knowledge dalam Pengambilan Keputusan Operasi Pintu Irigasi Berbasis Kuantifikasi Faktor Eksternal di Daerah Irigasi Sapon, Kulon Progo, Yogyakarta
Arinda Fadea Pramaesela, Dr. Ir. Murtiningrum, S.T.P., M.Eng., IPM., ASEAN Eng; Ir. Andri Prima Nugroho, S.T.P., M
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

EKSTERNALISASI *TACIT KNOWLEDGE* DALAM PENGAMBILAN KEPUTUSAN OPERASI PINTU IRIGASI BERBASIS KUANTIFIKASI FAKTOR EKSTERNAL DI DAERAH IRIGASI SAPON, KULON PROGO, YOGYAKARTA

INTISARI

Oleh:

Arinda Fadea Pramaesela
22/498303/TP/13505

Ketersediaan air irigasi yang optimal berperan penting dalam mendukung keberlanjutan produksi pertanian pada sistem irigasi. Operasi pintu irigasi di Daerah Irigasi Sapon, Kulon Progo, selama ini masih bergantung pada pengalaman dan intuisi petugas yang bersifat *tacit knowledge*, sehingga pengetahuan tersebut sulit didokumentasikan dan berisiko hilang akibat pergantian personel. Penelitian ini bertujuan untuk mengeksternalisasi *tacit knowledge* petugas operasi berbasis kuantifikasi faktor eksternal, yaitu permintaan petani, curah hujan hari sebelumnya, dan kondisi Sungai Progo, terhadap debit operasi pintu menggunakan Analisis Kuantifikasi Teori I. Analisis korelasi total, validasi model, dan korelasi parsial digunakan untuk mengevaluasi hubungan antara debit terukur dan debit prediksi serta untuk mengidentifikasi kontribusi masing-masing faktor eksternal pada enam pintu irigasi selama satu musim tanam. Hasil penelitian menunjukkan bahwa korelasi total antara debit terukur dan debit prediksi tergolong sangat kuat dengan nilai R berkisar antara 0,82–0,95. Secara parsial, permintaan petani dan kondisi Sungai Progo merupakan faktor yang paling dominan memengaruhi keputusan operasi dengan nilai korelasi parsial masing-masing sebesar 0,70–0,87 dan 0,57–0,94, sedangkan curah hujan hari sebelumnya memberikan pengaruh cukup dengan nilai korelasi parsial sebesar 0,34–0,53. Hasil tersebut menunjukkan bahwa keputusan operasi yang dilakukan petugas tidak bersifat acak, melainkan mengikuti pola yang konsisten dan terbentuk melalui pengalaman operasional selama bertahun-tahun. Berdasarkan hierarki *Data-Information-Knowledge-Wisdom* (DIKW), pengetahuan tersebut dianalisis untuk mengidentifikasi peluang transformasinya menjadi *explicit knowledge*. Hasil kuantifikasi selanjutnya diimplementasikan dalam bentuk *dashboard* sederhana berbasis Microsoft Excel sebagai media dokumentasi dan transfer pengetahuan operasi pintu irigasi kepada petugas berikutnya, sehingga risiko hilangnya pengetahuan akibat pergantian personel dapat diminimalkan.

Kata Kunci: Analisis kuantifikasi; debit irigasi; eksternalisasi pengetahuan; faktor eksternal; korelasi.

UNIVERSITAS
GADJAH MADA
Eksternalisasi Tacit Knowledge dalam Pengambilan Keputusan Operasi Pintu Irigasi Berbasis Kuantifikasi Faktor Eksternal di Daerah Irigasi Sapon, Kulon Progo, Yogyakarta
Arinda Fadea Pramaesela, Dr. Ir. Murtiningrum, S.T.P., M.Eng., IPM., ASEAN Eng; Ir. Andri Prima Nugroho, S.T.P., M
Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

EXTERNALIZATION OF TACIT KNOWLEDGE IN IRRIGATION GATE OPERATION DECISION-MAKING BASED ON THE QUANTIFICATION OF EXTERNAL FACTORS IN THE SAPON IRRIGATION AREA, KULON PROGO, YOGYAKARTA

ABSTRACT

By:

Arinda Fadea Pramaesela
22/498303/TP/13505

Optimal irrigation water availability plays a crucial role in supporting sustainable agricultural production in irrigation systems. The operation of irrigation gates in the Sapon Irrigation Area, Kulon Progo, has largely relied on the operators' experience and intuition, which constitute tacit knowledge. As this knowledge is difficult to document, it is vulnerable to being lost due to personnel turnover. This study aimed to externalize the operators' tacit knowledge by quantifying the influence of external factors, namely farmers' water demand, previous-day rainfall, and the condition of the Progo River, on irrigation gate discharge using Quantification Theory Type I. Total correlation, model validation, and partial correlation analyses were employed to evaluate the relationship between observed and predicted discharges and to identify the contribution of each external factor at six irrigation gates during one cropping season. The results showed that the total correlation between observed and predicted discharges was very strong, with correlation coefficients (R) ranging from 0.82 to 0.95. Partial correlation analysis indicated that farmers' water demand and the condition of the Progo River were the most influential factors affecting operational decisions, with partial correlation coefficients ranging from 0.70–0.87 and 0.57–0.94, respectively. Meanwhile, previous-day rainfall exhibited a moderate influence, with partial correlation coefficients ranging from 0.34 to 0.53. These findings indicate that irrigation gate operation decisions are not random but follow consistent patterns developed through years of operational experience. Based on the Data–Information–Knowledge–Wisdom (DIKW) hierarchy, this knowledge was analyzed to identify its potential transformation into explicit knowledge. The quantified knowledge was subsequently implemented in a simple Microsoft Excel–based dashboard as a medium for documenting and transferring irrigation gate operation knowledge to future operators, thereby reducing the risk of knowledge loss due to personnel turnover.

Keywords: Correlation; external knowledge; externalization of knowledge; irrigation discharge; quantification theory type 1.