

Lessons Learned from Institutionalization of ML (Machine Learning) Supported HR Services in the Existence of Multiple Institutional Logics

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ABSTRACT

This study explores how an organization has successfully implemented ML-supported HR services to resolve high employee turnover problems in the IT sector. The empirical setting of the research is where contradicting institutional logics exist among technical, HR, and business groups regarding the ML model development and use of the model predictions in HR services. Institutional framework is used to identify the roles of organizational actors and the legitimacy structures in the organizational environments that can shape or constrain the ML led organizational changes. In institutional theories, technology adoption and organizational change are not only constrained by organizational context, but also fostered through organizational actors' roles and efforts to increase the legitimacy for the change. This research found that when multiple contradicting institutional logics exist, legitimizing the establishment of an enabling environment for multiple logics to reconcile and for the project to move forward is critical. Industry-wide conditions, previous experiences with the pilot ML project, forming a TFT with clearly defined roles and responsibilities, and relevant KPIs are found to legitimize the HR team and the business division to collaborate with the technical personnel to launch ML-supported HR services.

Keywords: Machine Learning (ML), ML-supported HR Service, Technology Adoption, Organizational Change, Institutional Framework

I . Introduction

The discourse that AI is a game changer is spreading regardless of industry sectors (Daugherty and Wilson, 2018). AI transforms all areas of organ-

izations and industries, resulting in fundamental changes in how they operate and deliver values to customers and employees. Among the various types of AI, ML (Machine learning) plays a crucial role in this process by enabling them to analyze massive

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amount of data, find insights and make predictions. The predictive capabilities of the machine learning have revolutionized various fields especially HR domain in the IT sector where informed decision makings and planning are critical to resolve the problem of high turnover among employees.

According to a Gartner survey published in 2022, only 29.1% of respondents in the IT industry answered that they were willing to remain at their current job. It was particularly below average in Asia (19.6%), Australia and New Zealand (23.6%) and South America (26.9%). There were also differences in responses by age group. IT workers under 30 were 2.5 times more likely to leave than those over 50. Only 19.9% of IT workers aged 18 to 29 said they would continue working at their current job, while 48.1% of workers aged 50 to 70 said they had no plans to leave (Gartner, 2022).

Although the predictive capability of ML is considered to be beneficial to identify potential retirees, the integration of ML results into HR services for counseling potential retirees found to be challenging. In Kim and Kim (2022), the implementation of ML supported HR services for counseling potential retirees was found to be collaborative efforts among stakeholder groups such as IT and HR, involving ML model development and HR policy development to retain the potential retirees. The acceptance of the organization's change initiatives by the stakeholder groups were found to be imperative for the success of the initiatives. In fact, many ML supported organizational change initiatives result in pilot projects and fail to advance to organizational changes due to a lack of the stakeholders' acceptance and support (Davenport and Ronanki, 2018).

In organizational theory, institutional logic refers to socially constructed and shared assumptions, values, beliefs and rules, which plays a critical role in

influencing and guiding how individuals and organizations understand, interpret and behave within their institutional contexts (Thornton and Ocasio, 2008). Organizations often strive to certain practices and structures be accepted and integrated within an organization (i.e., institutionalize) as a part of their strategic initiatives (Scott, 1995). In this case, legitimacy, the perceived alignment of the organization's initiatives with the institutional logic becomes a basis for the stakeholders' acceptance of the organization's initiatives as appropriate. If there is misalignment between organization's initiatives and stakeholder expectations, the legitimacy may be challenged, leading to potential conflicts. Thus, managerial efforts to obtain legitimacy and enhance stakeholders' acceptance are emphasized in successful implementation of the organizational change (Deephouse et al., 2017; Scott, 2001). In institutional studies in the IS domain, legitimacy has received a significant attention to study IT-enabled organizational change (Avgerou, 2013; Kohansal and Haki, 2021). In these studies, IT-enabled organizational change is viewed as a process of legitimizing the IT adoption and the substitution of old processes with new ones.

This study explores how an organization that initially failed to institutionalize ML-supported HR services for potential retirees, has finally implemented the service successfully through organizational efforts to legitimize the organization's actions and change process. The empirical setting of this study is where multiple contradicting institutional logics (e.g., multiple assumptions, values and beliefs that different groups have (Ajer et al., 2021)) exist among IS, HR and business groups regarding the development and adoption of the ML-supported HR services. The ground theory building method is used as the research methodology. Before collecting data, extant literature covering institutional theories in both organizational

and IS studies are reviewed to identify potentially important concepts and constructs. The concepts and constructs were used to link the collected data to the research question. The data collection is done through interviews and company documents. After data are analyzed, research findings and future research are presented. The contents of this paper are presented according to the research methodology used in this study.

II. Literature Review

2.1. Social Constructionist View of Institutions

Institutions are comprised of a set of cultural-cognitive, normative, and regulative structures that provide the behavior context for social actors. Those structures guide and influence individual and organizational behavior within a particular social, economic or cultural context. According to Bultner (1988), social actors' language, gestures, and all manner of symbolic social signs are not within the control of the individuals but are socially and culturally influenced and historically constituted. Social actors not only are constrained by the social structure but also participate in shaping social structure through repetitive daily practices and mobilize change through the daily practices and processes (Giddens, 1984). Similarly, Acker (1992) views that "the law, politics, religion, the academy, the state, and the economy are institutions historically developed and symbolically interpreted from the perspective of social actors in leading positions, both in the present and historically (p. 567)." Overall, institutional theory emphasizes socially constructed institutional structures to understand how individuals, groups, organizations

or even bigger assemblages interact and make decisions within a given societal context (Ajer et al., 2021; Scott, 1995).

The institutional theory emphasizes the role of legitimacy in rationalizing the conformity of actions and gaining acceptance of those actions from the relevant stakeholders. The legitimacy refers to a perception or assumption that "the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions (Suchman, 1995, p. 574)." The legitimacy is further categorized into cultural-cognitive, normative and regulative legitimacies. While cultural-cognitive legitimacy represents taken-for-granted and unspoken assumptions and beliefs (Suchman, 1995; Leigh, 2011), normative legitimacy is based on a socially constructed value system about right procedures, structures, and outputs from an evaluator's point of view (Dimaggio and Powell, 1983). Regulative legitimacy is based on compliance with laws, policies and directives of institutions, which involves rule-setting, monitoring, and sanctioning processes (Scott, 2001). Organizations seek to understand the legitimacies in rationalizing their actions and outcomes (Deephouse et al., 2017). Also, organizations try to maintain or enhance the legitimacies through adopting strategies, practices, and programs.

Through institutionalization, practices and processes are routinized on a particular form or standardized throughout an industry (Scott, 1995). In industrial society, the social actors in the network society are interacting more than before and are forming actor networks (Castells, 2011). Thus, institutions become more assimilated than before in terms of formal structure, culture, programs or goals (Dimaggio and Powell, 1983). Types of institutional carriers include symbolic systems (i.e., values, expect-

ations and rules), relational systems (i.e., governance and authority systems), routines (i.e., procedures and protocols), and artifacts (i.e., objects meeting standards and conventions) (Scott, 2001).

2.2. Institutional theories in IS domain

Institutional theories have also received a significant attention to study IS phenomena, especially in enterprise architecture literature. The current studies in enterprise architecture focus on how organizations adopt and evolve enterprise architecture based on social and cultural pressures within organizations. When multiple institutional logics (e.g., multiple assumptions, values and beliefs that different groups) coexist for enterprise architecture operationalization, an organization's approach to settle tensions among the multiple logics by fostering interactions among actors is found to be effective to reach the equilibrium (Ajer et al., 2021). In another study done by Kohansal and Haki (2021), the legitimacy (def. a condition reflecting perceived agreement with the institutional logic) plays an important role to justify an organization's choices and resource allocations for the enterprise architecture.

Institutional framework is also found to be useful in the study of technology enabled organizational changes. In Kim and Kim (2022), how the legitimacy enables and constrains ML led organizational changes, is examined. The development of the ML model requires new tasks such as data acquisition, data quality improvement and prediction. This in turn requires new management roles with decision rights to control the new tasks. Developing new tasks, processes and functional units or divesting and discarding unnecessary processes and capabilities could led to the resistance from organizational members. They found that the organizations' efforts to decrease

legitimacy challenges occurred during this change process helped the organization move through the series of phases required during the change process.

Technology adoption by the organization mostly involves changes in a firm's operations and processes. Sometimes, the adopted technology invokes organization-wide changes and results in changes in organizational structure (Kim, 2010; Kretschmer and Khashabi, 2020). Institutional theory suggests that organizations can legitimize the structural changes by enhancing or conforming to the prevailing social values and norms in organizational environments. The theory also emphasizes organizational actors' roles and efforts in re-shaping social pressures related to technology adoption and change. According to Avgerou (2013), the transformation that is currently proceeding in the nature of work and organizations can only be understood by considering managerial roles to increase institutional momentum of IT innovation and to substitute the established structures and activities with new (Avgerou, 2013).

In institutional framework, technology adoption and change are not only constrained by organizational context, but also fostered through organizational actors' roles and efforts to increase the legitimacy for the adoption and change (Giddens, 1984; Lamb and Kling, 2013). Thus, the role of organizational actors (e.g., managers) as well as the properties of the selected technology need to be considered to understand technology-led organizational changes in an institutional context (Avgerou, 2013; Orlikowski and Barley, 2001).

III. Research Methodology

Using an institutional framework, this study explores how an organization generated ML-supported

HR service idea and how the service has been successfully implemented through the organization's efforts to obtain legitimacies of the services from key stakeholders. The constant comparative method is used to analyze the data. The constant comparative method compares and contrasts data to identify and refine concepts and patterns in an explorative way, which helps researchers have a deep understanding of the research subject (Glaser and Strauss, 1999). In order to improve the methodological rigor, extant literature regarding institutional theory was reviewed before data collection in order to identify potentially important concepts and constructs. The identified concepts and constructs are used to link the data to the research question (Eisenhardt, 1989). To further enhance reliability of the research, detailed research steps are prepared and documented (Yin, 1994).

Data were collected through interviews and company documents of an IT subsidiary of a Korean conglomerate. The IT subsidiary failed to adopt ML-supported HR services at the first trial and succeeded at the second attempt. Before conducting interviews, interview protocols were prepared. Based on the protocol, interviews with relevant personnel (<Table 1>) were conducted by asking research objectives followed by activities performed during the HR analytics adoption and organizational change. Issues, challenges and actions taken during the HR analytics adoption and change were also inquired.

<Table 1> Interviewee Information

Team	Informants	No. of Interviews
PM	2 managers	6 (23.05.16, 23.05.19, 23.06.22, 23.06.29, 21.12.21, 21.12.22)
Data Analysis	3 analysts	4 (23.05.16, 23.06.29, 21.12.27, 21.12.28)
Data engineer	1 engineer	4 (23.05.16, 23.06.29, 22.01.06, 22.01.07)
HR team	1 manager, 2 employees	7 (23.05.15, 23.05.16, 23.06.12, 22.01.12, 22.01.14, 22.01.24, 22.01.25)
Business division	3 manager, 3 employees	3 (23.06.26, 23.06.27, 23.06.28)

IV. Case Description

4.1. 1st Attempt of ML Led HR Process Change

4.1.1. DT Initiation

As a member of a conglomerate, INC has about 700 employees and provides IT services to the other member companies within the conglomerate. In 2019, there was an executive directive for DT (Digital Transformation) introduction throughout the conglomerate, and it was necessary to introduce DT. A TFT (task force team) was formed by IT department of INC to introduce DT within INC. The TFT are composed of the personnel from the IT department only. At that time, the leader of the TFT thought that DT is about technology.

At that time in INC, the resignation rate of employees with less than 5 years of service was three times higher than before, raising a serious concern. In order to improve this problem, the TFT selected ML-based predictive model development as the TFT's first project and started developing the ML model that can predict the potential retiree using 10 years of HR big data.

4.1.2. Model Development

Step 1. Planning

In the planning stage, the requirements of the

ML project including assumptions, required resources and constraints were derived. The participation of the HR team was a key in this process. However, it was difficult to obtain the cooperation with the HR team. According to the project manager, the head of the TFT,

“It was a project to develop a ML model using HR data and apply the model prediction to resolve the turnover problems. More than anything, the active participation of HR team was needed but they didn’t seem to think of this as their job. Above all, the process of finding HR problems and defining them as hypotheses was very tedious and difficult for the project team members who studied only technology without knowing the HR business at all.”

Step 2. Data Preparation

After the assumptions that can potentially solve HR problems were defined, data were collected and cleaned to develop an ML model. The types of data to be collected and the understanding of the data itself also depended on the active involvement of the HR team. However, the HR team was not cooperative. According to a data engineer,

“I didn’t know what data to get and where to get the data. HR staff were not coherent and did not fully explain what data could be used for analysis.”

Once data were acquired, the quality of the data should be inspected and improved. For example, how to deal with missing data and what to do with data recorded in different formats, lead to concerns about the level of data management in the company. According to a data analyst,

“First of all, the data recorded were very messy and

meaningless, such that data did not exist, data was scattered here and there, data had different input formats, and data whose meaning was unknown even though it was coded. The most common example is when the name of the employee’s home school is differently displayed, such as SeoulNationalUniversity, Seoul National University, or SeoulNationalUniversity(Seoul). Most of the input values of data were entered without rules. In addition, there was data containing strange codes, for example, aaaaa, and this data was found to be redundant data during the analysis process. It was really crazy. I have an unknown value, but I can’t figure it out unless I’m the person in charge who put it in..”

“The data cleaning process was really hard. A total of 10 years of data formatting, semantics and.. It was such a tiring job that I don’t want to do it again.”

Step 3. ML Algorithm Training and Testing

During the training and testing, it is important to track if the data fits to an ML model. New variables that improve the model performance might be necessary. In this case, communication with the HR team was required. However, communication with the HR team was not easy. According to a data analyst,

“We created a model by selecting various variables that can predict potential retirees. However, again, the lack of communication with the HR team caused the selected variables to be inappropriate and required rework. It seems to be the most important part to create a realistic ML model development is cooperation with HR team.”

The reason for HR being reluctant to cooperate with TFT throughout the model development process was that the success of DT was not related to HR team’s KPI. Once the ML model was finally developed and demonstrated to HR managers in 2020, it stimulated their curiosity about this new technology.

During the mid-term project review meeting, the CEO was very supportive about the project. The project manager (the leader of the TFT) reported to the CEO that the HR manager should participate in the TFT for the DT to succeed.

4.1.3. HR Process Change

In order for actions to be taken after predictions are made by the trained ML model with the production data (i.e., real-world data), it is necessary to have HR policies. According to the project manager

“I think management made the wrong choice. When the analysis results were reported based on the data, it was admired that there were many things that they did not know. For example, when you have a child, there are more male employees than female employees to leave for another company... But I was very surprised by the results of this analysis. I think the model prediction can be used for the purpose of knowing in advance who will or will not resign. The original purpose was to allow employees to stay at the company through more attention and care to employees. However, the model results were not properly utilized and did not result in HR policy improvement.”

The DT project did not continue further by linking the ML model prediction with HR policy. The reason is that HR did not have HR policies to be applied to the potential retirees.

4.2. 2nd Attempt of ML Led HR Process Change

4.2.1. Project Re-initiation

In 2023, after three years had passed since the

first trial, the risk of junior employees' departure issues and concerns were significantly increased both internally and externally, and the pressure to apply the ML technology also increased. More than 50% of INC employee left to move for another company. Thus, INC's top management took this problem very seriously and strongly pushed to improve the ML model and link the model predictions to HR policies improvement to reduce the turnover problems. Zero new employee resignation rate and 100% core personnel retention rate were selected as company KPIs for 2023. According to an employee from the HR team,

“However, I don't understand why the KPIs were selected as KPIs for the business division. New employees and key personnel should be supervised not by the business division but by the HR team at the company level. However, being selected as company KPIs means that this task will receive management attention.”

To discover the factors affecting employee turnover, the managers from the HR team and the personnel managers of the business division participated in the TFT. The following roles and responsibilities were assigned:

- 1) Technical Personnel (IT and Data)
 - Project Manager: project planning and coordination, schedule management, deriving business requirements, and making key decisions related to the project
 - Data Analysis: analyzing and deriving insights using ML technology
 - Data Engineer: data collection, preprocessing and data visualization
- 2) HR Team
 - : Providing expertise in human resources, support

for defining ML purpose and direction, assigning tasks to business division based on analysis results (e.g., identifying employees who are associated with ML results, conducting counseling, etc.) and monitoring data trends

3) Business Division

: Participating in ML development and verification, performing the tasks assigned by HR (e.g., identify employees who are associated with ML results, conducting counseling, interviews with employees who gave birth, mentors /mentee relationship analysis, etc.)

4.2.2. ML Model Improvement

By conducting surveys and reviewing existing literature, the TFT initially defined various factors related to employee turnover. Then, employees from the HR team, personnel managers of business division, and junior employees from the business division participated in workshops with free discussions. Through the workshops, the potential factors related to INC's employee turnover were selected. The factors considered for the model improvement include length of service, gender, age, marital status, and degree of license acquisition (e.g., when an employee has a child, there are higher chances of male employees leaving than female employees).

4.2.3. HR process change

The ML model allows INC to examine factors that contribute to decisions to leave. By addressing the identified issues, INC had opportunities to improve the work environment and HR policies. Thus, workshops were held with employees from the HR team, personnel managers of the business division, and junior employees from the business division to

obtain ideas for improving the work environment and HR policies. During the workshop, the ML model was explained, ways to apply the model predictions were discussed, and action items were derived.

The following major improvements were proposed as action items and those items have been successfully implemented:

- 1-month sabbatical leave for long-term employees
- year-end incentives
- extended parental leave for male employees
- various hobby programs (e.g., activities with family)
- improvement of the wage peak system
- additional positions between executives and general employees
- promotion of smart office
- introduction of a telecommuting system
- overseas training opportunities for outstanding employees
- weekend/holiday work allowance

The new policy intends to provide work-life balance and opportunities for growth and promotion. INC also tries to create benefits for senior employees, which creates an image of a company as a good place for long-term stay.

With the ML model, employees were categorized into groups and customized welfare policies such as extended parental leave and rewards for long-term stay employees were applied to each category. Realistic benefits can be proposed because employees from the HR team, personnel managers of the business division, and junior employees from the business division participated in this process. According to a junior employee from the business division who participated in this process as a key person:

“The workshop itself was interesting. We talked freely about what we needed to become a long-term staying company. We found that most of us had similar thoughts. For example, there were a lot of opinions about performance pay or long vacations. And best of all... we could see that the company was interested in us.”

4.2.4. HR Service Launching and Stabilization

In order to apply model predictions to HR counseling service, workshops were held several times with the management of all the teams and divisions. During the workshop, the ML model was explained and ways to apply the model predictions were discussed. As a result, an employee counseling service was launched. Managers in the divisions were trained to properly use the services for potential retirees.

Based on model prediction, the manager of each team or division is notified about who is likely to leave, and conducts intensive interviews and counseling for her or his grievances. This can be seen as examples of ML models being used for HR services. According to a personnel manager of the business division:

“It is impossible to do nothing at the moment when the number of employees leaving the company is increasing. Since everyone in the company gathered and tried to find a solution, we actively tried to apply the model predictions to our organization. In particular, in our division, individual sessions are held for employees who had personal events such as marriage or childbirth. This shows that we tried to support employee’s family life as much as possible.”

The variables of the ML model could be changing over time. INC intends to regularly update and improve the model by establishing a TFT as a formal

team. The team improves the ML model periodically by considering various internal and external environmental variables. This allows INC to continuously understand the drivers of employee attrition and improve welfare and personnel policies around them.

V. Data Analysis

Constant comparative method is used to analyze the case data. From the second column of the <Table 2>, project activities performed during the project phases, challenges/issues faced in each phase, action taken to resolve the challenges/issues, and legitimacy types required to resolve the challenges/issues are recorded. Codings were performed by the first and second authors of this study separately. Then the differences were resolved through discussion to meet intercoder reliability of a desirable level. The final agreement rate between coder has reached 100%.

The first trial was initiated by the executive directives. During the first trial, despite executive directives for DT, the HR team was hesitant to cooperate with TFT comprised only with technical personnel (Kim and Kim, 2022). The thoughts of HR and technical groups about the ML model development were different at that time. While the TFT thought the model development was important for HR, HR thought that was not their job.

Industry-wide problems of high turnover rates of junior IT employees enhanced the culture-cognitive legitimacy for the second attempt to develop ML-supported HR services for potential retirees. The significance of the industry-wide conditions along with the previous experiences with TFT during the first trial allowed HR to appreciate the benefits and values of the project re-initiation.

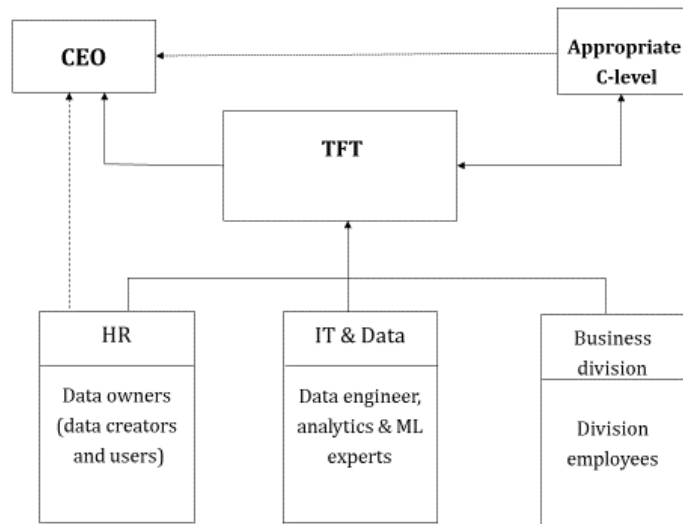
Along with the culture-cognitive legitimacy, the

<Table 2> Coding Categories for INC's ML Project after 2023

	Phases of organizational change	Challenges/Issues	Actions Taken	Legitimacy Required
1st attempt (Adapted from (Kim and Kim, 2022))	DT Initiation	Digital transformation throughout conglomerate	-Order by conglomerate's president to start DT projects -Set the levels of DT as KPI for INC but for HR team	-Regulatory for INC -Lack of regulatory for HR
	Model Development	-HR project was selected by IT -Lack of communication with HR department -Difficulty of locating data and developing model	Resist by HR department	Lack of normative in HR department,
	HR Process Change	Lack of HR policy aligned with the purpose of AI model	Resist by HR department	Lack of normative in HR department,
2nd attempt	Project Re-instate	Seriousness of industry-wide IT personnel turnover problems	Re-instate the ML project; Establish TFT with clear roles and responsibilities defined; zero resignation rate is set as KPIs for all divisions that participated in TFT	Cultural-cognitive; Regulatory; Normative
	Model Improvement	Identification of factors affecting personnel's turnover	TFT conducted surveys and free discussions with employees from HR team and business division	Cultural-cognitive; Regulatory; Normative
	HR Process Change	Linking ML model predictions to HR policy improvement and work environment enhancement	HR team participated in HR policy development and work-environment enhancement	Cultural-cognitive; Normative
	Service Launching and Stabilization	Use of model predictions in employee counseling services.	Through multiple workshop sessions, IT and HR team helped the business division to perform counseling services	Pragmatic

regulatory legitimacy based on directives and KPIs became the basis of forming the normative legitimacy to establish the TFT with clear roles, responsibilities and routines defined. Since the impact of the project is organization-wide, the personnel from the business division also participated in the TFT. Forming a TFT comprised of technical personnel and the managers of HR and business division was necessary for the groups with different institutional logics to reconcile

and settle disputes and tensions. The TFT with clearly defined roles, responsibilities and routines also provide the normative legitimacy for the coordination activities among the groups (i.e., HR, business division and technical groups) throughout model development and HR process change. Along with those legitimacies established throughout the change process, the series of training workshops with management for the use of counseling services became the



<Figure 1> Enabling Environment for ML-led Organizational Change

basis of forming pragmatic legitimacy for the use of ML-supported HR services.

VI. Key Research Findings

This research found that when multiple institutional logics exist, legitimizing the establishment of an enabling environment for multiple logics to reconcile and for the project to move forward is critical. Once the directions for the change is broadly set, top management of the INC understood the importance of establishing an enabling environment and working with appropriate executive manager (e.g., CIO in INC's case; increasingly, Chief Data Officer¹⁾) to create a TFT consisting of key stake-

holders of ML-led organizational change (<Figure 1>).

As shown in the case, HR, the data owner group, creates and uses data. They know the meaning of the data and are able to interpret the results of the ML model. It is important that the data owner group collaborates with technical personnel such as data engineers and ML model developers to develop ML models with the relevant data. In addition, the data owner group needs to continuously cooperate with ML experts to monitor changes in data such as statistical properties. Thus, the routines need to be built to facilitate their communications and interactions. Once ML based HR policies and services are developed by HR, the business divisions need to perform the services as daily practices and processes (i.e., identifying and counseling the potential employees). Together with ML experts, the data owner group needs to be involved with educating business division managers in relation with performing new practices and processes. Therefore, legitimizing routines among stakeholders and mobilizing the routines

1) Organizations with a dedicated Chief Data Officer (CDO) tend to have a clear direction for digital transformation, compared with the organizations without a CDO. Source: Harvey Nash/KPMG CIO survey 2020: Everything changed. Or did it? <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2020/10/harvey-nash-kpmg-cio-survey-2020.pdf>, accessed on August-21.

when needed are found to be imperative for the success of implementing and managing the ML-supported HR services.

In organizational theory, the elements of an organizational structure not only include routines but also decision rights and evaluation systems (Hall, 1991; Hoogervorst, 2004; Sah and Stiglitz, 1986; Smith, 2001). Proper delegation of the decision-making authority with the performance evaluation systems influences the behavior of organizational actors. Along with forming the TFT and establishing routines, setting relevant KPIs for both the TFT members and key participants legitimizes their cooperation in the ML-led process change.

In summary, we found that industry-wide conditions, previous experiences with ML model development, forming the TFT with clearly defined roles and responsibilities, and relevant KPIs legitimized the HR team and the business division to collaborate with the technical personnel for the ML-led HR process change. The consensus on the changes consequently enhanced the legitimacies for the improvements in HR policies and employee welfare systems and for implementing and adopting the counseling services for the potential employees.

VII. Discussions and Future Research

The main contribution of this study is to provide insight on institutionalization of the ML-supported HR services in the existence of multiple institutional logics by considering managerial roles and the characteristics of the ML technology. This study is a single case study with aiming for 'explore' and for insight. The results of this kind of research can be refined by researchers in many different ways in the future. One way of refining is performing multiple case stud-

ies and deriving propositions about the institutionalization of organizational change through legitimacy lens. Another way of refining is conducting multiple case studies and deriving generative mechanisms to explain some level of causality. Each way of refining the current research is described in the following sections, 7.1 and 7.2.

7.1. Deriving Propositions as Future Research

Based on INC case, the success of ML-led HR process change can be described as a series of the legitimacy enhancing efforts (<Figure 2>) and the propositions can be derived as follows:

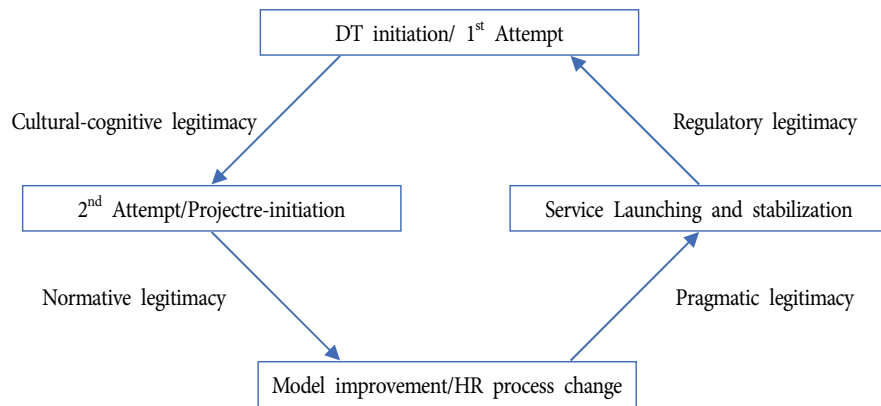
Proposition 1. Regulatory (through directives and KPIs) and cultural-cognitive and legitimacies in <Figure 2> are prerequisite to the normative legitimacy for the ML-led HR process change in the existence of multiple institutional logics.

Proposition 2. The legitimacies in Propositions 1 are prerequisite to the pragmatic legitimacy required to adopt the ML-supported HR services in the existence of multiple institutional logics.

Through an analysis of more case studies, some refinement of the above propositions can be done. The refined propositions then could provide some level of generality beyond the INC case.

7.2. Deriving Generative Mechanisms as Future Research

The above propositions indicate that organizational efforts to enhance the legitimacy enable the organization to proceed through the series of transformation phases. This in turn could elaborate institutional momentum and legitimize further innovation



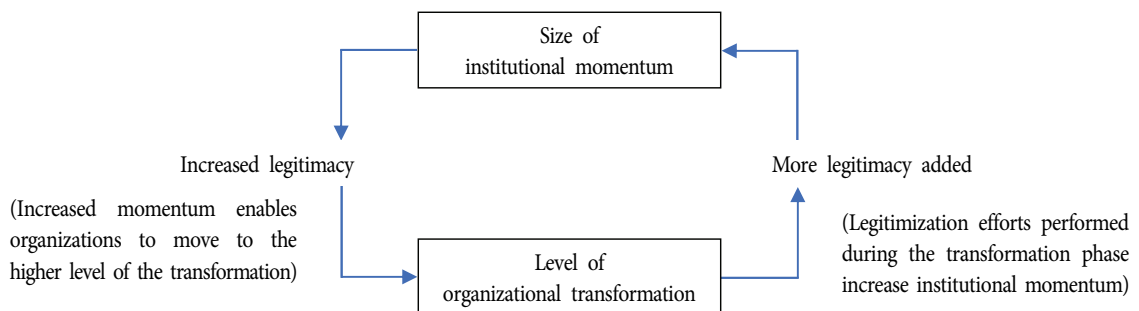
<Figure 2> Legitimization in ML-led Organizational Change (Adapted from Kim and Kim, 2022)

in the future.

This can be viewed as a series of the legitimacy enhancing cycle in <Figure 3>: 1) legitimization efforts increase institutional momentum; 2) the increased momentum enables organization to proceed to higher transformation level; and 3) this in turn reproduce or elaborates the institutional momentum. Repetition of the legitimacy enhancing mechanism could increase the chance of success in the change efforts. The INC case is the case that confirms the legitimacy enhancing cycle proposed in the previous study (Kim and Kim, 2022).

The legitimacy enhancing cycle has some initial possibilities to be generative mechanisms. By conducting more case studies, generative mechanisms

can be derived to explain some level of causality. The generative mechanism refers to the process that produces a particular outcome or event within the context being examined. Unlike a causal relationship between variables where changes in one variable directly lead to changes in another, the generative mechanism has ‘potential’ to cause an event. For example, in the study done by Bygstad (2010), two generative mechanisms are proposed: (1) The innovation in ICT infrastructure led to the creation of new services; and (2) this in turn generates more profits which could be further used to finance more innovation in ICT infrastructure. Considering the nature of an information system as a complex social structure, the generative mechanisms can be viewed as social



<Figure 3> Legitimacy Enhancing Cycle for Organizational Change (Adapted from Kim and Kim, 2022)

processes that are capable of generating or constraining some change in all or part of the system (McGrath, 2013). Such process is considered to consist of “structures, activities and events that interact to produce or inhibit the change” (McGrath, 2013, p. 6). Thus, the generative mechanisms often involve a combination of social, economic, cultural or individual elements that contribute to the observed phenomena. Identifying and understanding these generative mechanisms is crucial for developing middle range theories in IS fields.

In studies about organizations, the generative mechanism “may arise from a structure, or from the relation between structures, or from the relations between structure and actors”, “that enable and constrain action” (Volkoff and Strong, 2013, p. 822). From an institutionalist perspective, the structure refers to cultural-cognitive, normative, regulative and pragmatic structures in an institutional environment that enable and constrain the actions of social actors. Not only does the institutional structure influences the behavior for social actors, the social actors participate in shaping the institutional structure through daily practices and processes (Giddens, 1984).

Specifically, <Figure 3> contains two generative mechanisms: (1) structure-initiated innovation-generation mechanism and (2) actor-initiated innovation-implementation mechanism. In the structure-initiated innovation-generation mechanism, the

structure means institutional structure. Thus, an example of this mechanism could be that the positive cultural-cognitive and regulatory structures of the organization enable managers to re-initiate the ML led HR process change and establish a cross-functional TFT with clearly defined roles, responsibilities and routines. In the actor-initiated innovation implementation mechanism, actor can be managers. Thus, an example of this mechanism could be that the manager’s efforts to maintain or enhance the legitimacy of the ML model development and HR policy development have increased the institutional momentum to advance to the next level of the organizational change (i.e., service launching).

The generative mechanism is not a universal law. All the technology-enabled change efforts in organizations cannot be explained only by the legitimacy enhancing mechanism. However, by uncovering the generative mechanism that generates certain outcome (i.e., the success or failure of technology-enabled organizational change), we can identify potential causal factors and understand how changes in those factors could lead to changes in the observed outcome. Theories and causal mechanisms are generated with more rigorous testing and evidences (Kieser, 1994). Thus, more case studies with the historical data across different companies with different domain are called for as future research.

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