

Article

Ontological perception of a smart unified organizational compliance model to mitigate financial risk and promote sustainability in the manufacturing sector

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Abstract: This research intends to find out the compliance acts based on the manufacturing industry of Bangladesh and lead to the development of the integrated theory of compliance model. There are several compliance regulations, that are separately dealt with in any manufacturing organization. These compliance regulations are handled at various ends of the organization making the process quite scattered, time-consuming, and tedious. To fix this problem, the integration of organizational compliance regulations is brought under one platform. Researchers have applied the qualitative approach with multiple case studies methodology scrutinizing the in-depth interviews and transcripts. Furthermore, the NVIVO tool has been used to analyze, where the necessary themes of the Organizational Compliance Regulations are found. Therefore, we have proposed a conceptual framework to inaugurate a standalone combined framework, which is an innovative and novel measure.

Keywords: compliance; manufacturing; qualitative; model; sustainability

1. Introduction

Usually, manufacturing companies' deal with the compliance regulations separately in parallel to the other modules of the companies besides policies of Finance and Accounting, Information Technology, Security and Safeguard, Human Resource Management, Administration, Transportation, Operations, Manufacturing Productions, Factory Distributions, Marketing and Publicity, Govt. Regulations Upgradations etc. Dealing with compliances in each division becomes quite complicated, time-consuming, and tedious (Davis, 2019). Therefore, researchers have conceived an innovative approach to address compliance issues comprehensively across the manufacturing sector. This solution is designed to function equally well for large manufacturing companies as well as small and medium enterprises. The proposed solution has been where a compliance model has been designed to

incorporate and integrate organizational compliances (Alt and Spitzberg, 2016; Alt et al., 2015).

Previously, various scholars have made efforts to make compliance processes smooth. Nevertheless, researchers here have taken the initiative to introduce the model to the manufacturing base for a faster and smoother process with less complexity, less risk and less hassle. According to Checkland and Poulter (2020), soft systems technology has been applied along with the reflection of Technology Road-mapping (TRM) measurement to reveal that this entire procedure is a sustainable way to build or re-build organizations' integrated compliance model (Adam et al., 2009; Andalib et al., 2020; Auerbach and Silverstein, 2003; Denai et al., 2007; Isa and Amin, 2022; Usman and Projo, 2022). This paper aims to introduce an integrated compliance model in the manufacturing companies.

Several regulations national and international are loaded every now and then specially whenever it is about the manufacturing companies. It becomes an extra headache to deal with these regulations separately. Even though almost every company has separate department and unit to deal with these issues. Often, it gets jumbled up. Few regulations are strictly for the companies to follow and few are strictly for the employees to follow. To sort these properly and to function all of these properly needs an integrated model with a huge data load.

As per Andalib (2018) and Davis (2019), Manufacturing organizations need to comply with various standards, complicated architectures, processes and external regulations and laws. The large manufacturing companies follow one pathway to deal with these and the SMEs follow another pathway to handle these and in both cases the regulations do change slightly based on few criteria and conditions of the organization. For last decade this has become a booming necessary study arena. Several acts, policies, action plans, guidelines have been already there and later on frameworks and models to bring all of it together has been main emphasis arena for the scholars (Andalib et al., 2019a; Mccavish, 2012; Miles et al., 2014).

A deeper ontological look at the Smart Unified Organizational Compliance Model contributes to the development of financial risk and sustainability within manufacturing; hence, it is of the essence. In this respect, Smart Unified Organizational Compliance Model (SUOCM) attempts to integrate compliance-risk management performance into one unified framework that will be aligned with the operational goals of manufacturing companies. It is not only regulatory compliance risk that must be managed but also strategic risk, while at the same time encouraging sustainable business through lessened environmental impact and increasing the chances of long-term economic viability.

The risks in the manufacturing sector are generally financial in nature, emanating from violations of the law, unstable market conditions, and lack of efficiency within the operations. These risks, to an extent, are mitigated by SUOCM through the promotion of good governance and introducing metrics on sustainability as set based on global standards, for instance, those provided under the UN's Sustainable Development Goals. The integration of a smart compliance model using ontological reasoning, for example, would eventually enable an organization to deal with regulatory challenges that arise from a complex environment in coherence with the general aims of sustainability. All this ensures that compliance is reactive, predictive, and proactive in view of the

resilience of a company and its competitive advantage, as explained by Deloitte (2024) and Jiménez et al. (2024).

Indeed, the ontologically driven models, most certainly, work better in bringing more clarity and responsibility to decision-making processes within manufacturing for better financial forecasting and resource management. This is helpful for mitigating various risks-namely, market fluctuation and operational disruption-while promoting sustainability goals for the long term (Mahendra et al., 2024).

The research objectives of this paper are mentioned below:

RObj1: To identify codes and themes of the manufacturing companies' compliance regulations for employees,

RObj2: To re-engineer and integrate these compliances for human resources' codes,

RObj3: To establish a standalone compliance model for the manufacturing company.

2. Materials and methods

In this study, a qualitative approach was adopted, utilizing in-depth interviews and philosophical paradigms such as ontological and methodological frameworks through multiple-case studies (MCS) in Bangladeshi manufacturing organizations, along with 'content analysis' and 'thematic analysis' (Stake, 2010). Almost 100 scholarly articles are inspected for this purpose by operating Nvivo tool. Andalib (2018) and Eisenhardt and Graebner (2007) mentioned this process as a systematic qualitative analysis, where interpretative technique has been applied to summarize; since, where twelve cases are studied to analyze and understand the core components of the cases (Hoonlee et al., 2013; Merriam, 1995; Yin, 2009). Also, multiple cases are applied to collect data that provide stronger spot to connect the co-ordinates accordingly in the final integrated framework (BEF, 2009; Denai, 2007). Yin and Merriam have confirmed that numerous case studies utilize the logic of replication, where the procedures are repeated for each individual case, where each case is interpreted with rich context. Multiple case studies apply a critical tactic to recognize matters; identify and confirm the common themes (Onwuegbuzie et al., 2009).

Here, these methods are replicated for all the cases to identify the common themes of the compliances of the employees' and to do thematic analysis to converge these themes with employee rights' protocols and redesign it with proper integration (Andalib and Halim, 2019; United_Nations, 1945). And, finally, integrate this compliance model for the manufacturing companies. There are four major methodology steps for this study, which are discussed in the following three steps like 1. Purposive Sampling, 2. Data Collection and 3. Theory Building. Researchers in here have applied the purposive sampling method while selecting the cases and participants where central concept of the study is highlighted. Participants' understandings about the central problem also contribute to the core idea in here (Auerbach and Silverstein, 2003). For this particular research, authors have chosen twelve companies to follow the pattern of Andalib (2018) as well as to apply Eisenhardt's layer sampling technique. As per the Bangladesh's company Act having more than 500 employees are considered as a medium range company as per the company act of Bangladesh, therefore, in this study, three criteria are chosen to identify the companies, having

more than 500 employees where machineries are used in the manufacturing companies are chosen. This study provides an in-depth description and analysis of manufacturing companies' compliances for employees based on various cases. Data were collected from twelve companies and eighty-seven participants through in-depth interviews, literature, annual reports, and company documents in a thorough methodological manner. Following Creswell and Creswell (2022), and Creswell (2013), data were stored as transcripts, memos, reports, audio-visual materials, and documents, and were coded into themes using NVIVO. Purposeful sampling was used to select cases and participants, with individuals contributing to the central problem of the study.

Researchers have scrutinized and done thematic analysis on the compliance components those are effective for the employees specifically, thoroughly to mix and match these elements when needed. In this study, scholarly works have been searched through scholarly databases WoS, Scopus, Proquest, Emerald, Elsevier and etc. by using the specified key words like manufacturing companies', compliance model, integration, linkage with compliance components are searched and stored in NVIVO (Andalib et al., 2019b).

Researchers used the coding technique outlined by Locke et al. (2022) and Auerbach and Silverstein (2003), focusing on research concerns and raw text. The steps of coding included: 1. Understanding data, 2. Selecting data for coding, and 3. Constructing a coding mechanism. Corbin and Strauss (2008), along with Miles and Huberman (1994), proposed the transfer of participants' dialogues to the study's objectives, theories from the scholars with their narratives, multiple constructs like categorized codes, themes, repeated concepts, relevant ideas and codes and raw text. The emphasized dialogues were then selected by identifying repeated data. The inductive coding process included open codes (research concerns and beliefs), categorized codes (discarding orphan data, narrowing or broadening ideas), themes (common ideas or topics), and constructs (abstract concepts organizing themes into a theoretical framework). This process aimed to integrate and re-engineer a new compliance model, turning employees' subjective experiences into a coherent narrative using their language (Alt and Craig, 2016; Foorthuis et al., 2011) (see **Table 1**).

Table 1. Literature review regarding organizational compliances.

Essential Compliance Factors	Depiction	Scholars' Ref
Company Acts, Corporate Governance & ISO standards	Size of the Company, Revenue of Company, Turnover of the Company, Establishment Year and Protocol related to that of the company, Product of the Company	Andalib (2018); Ali et al. (2022); Berle and Means (1993); Brickley and Zimmerman (2010); Freeman, (1984); Freeman et al. (2020); Hörisch et al. (2020); ISO (2022a); ISO (2020); Khanifah et al. (2023); Keasey and Wright (1993); Ledi and Ameza-Xemalordzo (2023); OECD (1999); Roy (2016); Radu and Smaili (2021); Wicaksono and Setiawan (2022); Zaman et al. (2022)
Manufacturing Regulations	Garments companies, Telco companies, Pharmaceuticals Companies, Product type, Production machineries, Product Safety and Quality Standards, Environmental Regulations, Workspace Measurements and Environment, Compliance and enforcement	Andalib et al. (2020); European Chemicals Agency (2020); Salah et al. (2020); Smith and Brown (2018)
Employees' Rights	Universal Declaration of Human rights, International Labour organization, Bangladesh Labour Organization	Andalib (2018); Andalib et al. (2019a); ILO (2012); United Nations (1945)

Table 1. (Continued).

Essential Compliance Factors	Depiction	Scholars' Ref
Models & HRM policies, Models and frameworks	HRM models, Employees' Contract and Benefits' agreement, Standard operating procedures, Sarbanes Oxley Act, Atkearney benchmarking, BTRC compliance Acts, Michigan Model, Harvard Model, Communication Model, Contingency Model, Outcome	Foorthuis and Bos (2011); Gensler (2019); Lin et al. (2019); Stake (1995); Smith (2020); Tiwari et al. (2012)
Employee Guidelines	Employees' remuneration Act, Employees' provident fund, gratuity and pension scheme, Employees' benefits, Employees' Role matrices, Employees' health insurance policies, Code of Conduct and Ethics	Andalib et al. (2020); Tiwari et al. (2012)

2.1. Company ACT, corporate governance and ISO standards

It seems like you're asking about the regulations or guidelines that govern companies, often referred to as the Company Act. These are typically laws enacted by governments to regulate the formation, governance, and dissolution of companies. The Companies Act in Bangladesh governs the formation, operation, and dissolution of companies operating within the country. The most recent Companies Act in Bangladesh is the Companies Act, 1994, which has been amended over the years to reflect changes in business practices and regulatory requirements. It's important to note that amendments to the Companies Act, 1994, and additional regulations may have been introduced since its enactment. Therefore, companies should regularly review legal updates and consult with legal professionals to ensure compliance with current laws and regulations in Bangladesh. Here are some key aspects relevant to manufacturing companies under the Companies Act, 1994.

Incorporation and Registration & Types of Companies: The company act talks about the procedures for incorporation, including requirements for minimum capital, registration documents, and submission to the Registrar of Joint Stock Companies and Firms (RJSC). It also provides for different types of companies that can be formed, such as private limited companies, public limited companies, and joint venture companies. Manufacturing companies often opt for private or public limited company structures.

Corporate Governance & Compliance and Disclosures: Requirements for corporate governance, including roles and responsibilities of directors, shareholders' rights, annual general meetings (AGMs), and reporting obligations are discussed as well as the requirements for regulatory filings, disclosures to shareholders and regulatory authorities, and adherence to corporate laws and regulations are discussed as well. According to the stakeholder theory the organization is composed of various stakeholders (any group or individual) that could affect or are affected by the organization (Freeman, 1984). It is essential to balance the interest of the various stakeholders (Radu and Smaili, 2021). The entire organization can be disrupted if this balance is not maintained (Freeman et al., 2020). The manager must create value for the stakeholders (Hörisch et al., 2020) and the stakeholder theory reiterates the importance of building a good relationship with stakeholders and treating them in the best manner (Wicaksono and Setiawan, 2022). A conflict-of-interest results in a company performing

poorly (Ledi and Ameza-Xemalordzo, 2023). The agency theory states that nowadays managers act in their personal best interest instead of the shareholders' best interests (Khanifah et al., 2023). Consequently, it is necessary to apply corporate governance since corporate governance balances managers' and stakeholder's interests in order to resolve the agency conflict (Ledi and Ameza-Xemalordzo, 2023). Corporate governance balances managers' and stakeholders' interests to reduce agency conflict (Ali et al., 2022). Corporate governance is a system that provides guidelines to direct and control organizations whereby the rights and responsibilities of the stakeholders are identified and rules and procedures are specified (OECD, 1999). Keasey and Wright (1993) argue that the success of an organization is strongly tied to the 'structure, process, culture and systems' which is corporate governance. Corporate governance establishes a formal structure among the shareholders, board of directors and the CEO to resolve agency conflicts (Berle and Means, 1993). The impact of legal systems, markets and policies can impact corporate governance policies (Brickley and Zimmerman, 2010; Zaman et al., 2022).

ISO standards: The International Organization for Standardization is an independent, non-governmental international organization that facilitates the development of voluntary international standards to bolster innovation and provide solutions to global challenges (ISO, 2022a). ISO formulates and publishes international standards that ascertain safety, quality and efficiency of products and services in diverse areas such as manufacturing, technology, healthcare, etc. (ISO, 2022a). Many manufacturing regulations are based on international standards set by organizations like the International Organization for Standardization (ISO). ISO standards, such as ISO 9001 for quality management systems and ISO 14001 for environmental management systems, provide a framework for establishing, maintaining, and improving regulatory compliance (ISO, 2020). Adopting these standards helps manufacturers streamline their operations, improve product quality, and meet global market requirements.

Compliance and Enforcement: Compliance with manufacturing regulations is monitored through regular inspections, audits, and reporting requirements. Regulatory bodies have the authority to impose fines, mandate product recalls, or shut down operations if a company fails to adhere to the standards. For example, in the European Union, the Registration, Evaluation, Authorization, and Restriction of Chemicals regulation (REACH) requires manufacturers to provide safety information about the chemicals they use, ensuring that their products are safe for human health and the environment (European Chemicals Agency, 2020). Compliance monitoring and enforcement mechanisms ensure that guidelines are followed consistently and fairly across the organization.

Financial Reporting and Audit, Mergers and Acquisitions, Insolvency and Liquidation: Obligations related to financial reporting, preparation of financial statements following applicable accounting standards, and auditing requirements. Regulations governing mergers, acquisitions, and amalgamations of companies, including approval processes and requirements for shareholder consent. Procedures for handling insolvency, bankruptcy, and liquidation of companies, protecting the interests of creditors and shareholders.

2.2. Manufacturing regulations

Manufacturing regulations are essential frameworks established to ensure safety, quality, environmental protection, and fair labor practices within the industry. These regulations vary by country and industry but typically cover areas such as product safety, environmental standards, worker health and safety, and quality control. **Product Safety and Quality Standards:** Product safety and quality standards are designed to protect consumers from dangerous or substandard products. For instance, the U.S. Food and Drug Administration (FDA) regulates the manufacturing of food, pharmaceuticals, and medical devices to ensure they meet rigorous safety and effectiveness standards (FDA, 2020). Similarly, in the European Union, Clean Environment (CE) marking indicates that a product complies with essential health, safety, and environmental protection requirements as defined in relevant directives (European Commission, 2020). Compliance with these regulations is mandatory, requiring manufacturers to implement extensive testing, quality assurance, and documentation processes.

Environmental regulations: Environmental regulations aim to reduce the ecological impact of manufacturing activities. These rules cover waste management, emissions control, and the use of hazardous materials. For example, the Environmental Protection Agency (EPA) in the United States enforces laws such as the Clean Air Act and the Clean Water Act, which limit the levels of pollutants that manufacturers can release into the environment (EPA, 2021). Companies must obtain permits, conduct environmental impact assessments, and adhere to specified emissions and waste limits. Non-compliance can lead to substantial fines, legal actions.

Workspace Measurements and Environment: Effective workspace measurements and a conducive environment are critical for maximizing employee productivity and satisfaction. Properly designed workspaces that consider ergonomics, lighting, and noise levels can significantly enhance employee well-being and efficiency (Gensler, 2019). Research indicates that an optimized physical environment can reduce stress and absenteeism while boosting overall performance (Smith, 2020). Workspace measurements and environment play a crucial role in enhancing productivity and ensuring employee well-being. Proper workspace design includes considerations such as ergonomic furniture, adequate lighting, optimal temperature, and noise control. According to a study by the International Journal of Environmental Research and Public Health, ergonomic interventions in the workplace significantly reduce musculoskeletal disorders and improve worker comfort and efficiency (Lin et al., 2019). Additionally, workspace measurements should comply with occupational health and safety standards, which mandate specific spatial dimensions and environmental conditions to prevent injuries and promote a conducive work atmosphere. Ensuring that workspaces are designed with these factors in mind can lead to higher employee satisfaction and productivity.

Product Types and Production Machineries: The type of product and the production machinery used are pivotal aspects of manufacturing processes. Different products require specific types of machinery tailored to their production needs. For instance, the production of electronic devices necessitates precision machinery capable of handling delicate components, whereas the manufacture of automotive

parts requires robust machinery designed for heavy-duty operations. According to the *Journal of Manufacturing Processes*, the selection of appropriate production machinery is critical in ensuring product quality, reducing production costs, and increasing operational efficiency (Smith and Brown, 2018). Additionally, advancements in technology, such as automation and smart manufacturing systems, have revolutionized production processes, enabling manufacturers to produce high-quality products at a faster rate and lower cost. Understanding the relationship between product type and machinery is essential for optimizing production workflows and achieving competitive advantage.

2.3. Employee rights

Employee rights are legal and ethical standards designed to protect workers from unfair treatment and ensure a safe, respectful, and equitable work environment. These rights encompass a range of issues including fair wages, safe working conditions, freedom from discrimination, and the right to unionize. Specific regulations related to labor and employment applicable to manufacturing companies, including provisions on working conditions, wages, and employee rights.

Remuneration and Benefits: Employees have the right to receive fair wages and reasonable working hours. Laws such as the Fair Labor Standards Act (FLSA) in the United States establish a minimum wage, overtime pay, and child labor standards to ensure that workers are compensated fairly for their labor (U.S. Department of Labor, 2020). Compliance with these regulations is mandatory for employers, who must keep accurate records of employee hours and wages.

Safe Working Conditions: The right to a safe and healthy workplace is a fundamental employee right. The Occupational Safety and Health Administration (OSHA) sets and enforces standards to ensure safe and healthful working conditions. Employers are required to provide a workplace free from serious recognized hazards and to comply with OSHA standards (OSHA, 2019). Employees also have the right to receive information and training about workplace hazards and can request OSHA inspections if they believe their workplace is unsafe.

Freedom from Discrimination: Employees are protected from discrimination based on race, color, religion, sex, national origin, age, disability, or genetic information under laws such as Title VII of the Civil Rights Act and the Americans with Disabilities Act (ADA) (U.S. Equal Employment Opportunity Commission, 2020). These laws ensure that all employees have equal opportunities and are treated fairly in all aspects of employment, including hiring, promotions, and terminations.

Right to Unionize: The right to form, join, or assist labor unions and to bargain collectively with employers is protected under the National Labor Relations Act (NLRA) in the United States. This act prohibits employers from interfering with employees' rights to organize and ensures that employees can engage in concerted activities for mutual.

2.4. HRM models and policies

The Harvard Model, developed by Michael Beer and his colleagues at Harvard University in the early 1980s, emphasizes the importance of considering multiple

stakeholders in the formulation of HR policies and practices. This model highlights the interplay between various elements of HRM and its impact on organizational outcomes. The Harvard Model's holistic approach allows organizations to integrate HRM with broader business strategies, promoting a more comprehensive and inclusive view of managing people. It encourages managers to consider the broader implications of HR decisions, fostering a culture of ethical and socially responsible HR practices (Beer et al., 1984).

2.5. Employee guidelines

Employee guidelines are essential documents that outline expectations, policies, and procedures governing behavior and performance within an organization. These guidelines serve to ensure clarity, fairness, and compliance with legal and ethical standards, fostering a positive work environment conducive to productivity and mutual respect. Implementing employee guidelines involves communication, training, and enforcement. Organizations should ensure that guidelines are clearly communicated to all employees, regularly updated to reflect changes in policies or regulations, and integrated into training programs.

Code of Conduct and Ethics: A code of conduct establishes the ethical principles and standards of behavior expected from employees. It typically covers topics such as integrity, honesty, respect, confidentiality, and compliance with laws and regulations. For instance, employees are expected to maintain confidentiality of sensitive information and avoid conflicts of interest (SHRM, 2020). The recent increase in corporate scams around the world reflects the upsurge of unethical activities in the business environment. To mitigate such practices, companies are focusing on establishing an ethical business culture through implementing code of conduct for employees (Jha and Singh, 2023).

Workplace Policies: Workplace policies address various aspects of employment, including anti-discrimination policies, harassment prevention, attendance, dress code, and use of company resources. These policies ensure consistency and fairness in the treatment of employees and provide guidelines for resolving disputes and grievances (SHRM, 2020). Moreover, facilitating an appropriate working environment and meeting worker satisfaction through policies may improve employee retention (Ajala, 2023).

Health and Safety Guidelines: Employees working in manufacturing industries are specially exposed to physically challenging situations (atmosphere, posture & position, temperature) creating a health hazard condition both in short-term or long-term (Abatan et al., 2024). Health and safety guidelines outline procedures and responsibilities for maintaining a safe and healthy work environment. This includes practices such as reporting hazards, using personal protective equipment (PPE), and emergency procedures. Prevention through regular risk assessment of current practices and potential analysis of future processes can also be put forth (Abatan et al., 2024). Compliance with these guidelines is critical to preventing accidents and promoting employee well-being (OSHA, 2019).

Communication and Collaboration: Due to the dynamic business environment, employees are now required to act as proficient and strategic communicators to

effectively contribute to the organizational goals (WM Verhoeven and Thøis Madsen, 2022). Guidelines for communication and collaboration help establish expectations for teamwork, effective communication channels, and respectful interactions among employees. Favorable outcomes in collaboration are strongly associated with impartments of skills and expertise thereby fostering trust (Thornhill-Miller et al., 2023). Hence, clear guidelines facilitate cooperation, reduce misunderstandings, and enhance productivity (SHRM, 2020).

Performance Expectations: Employee guidelines also include performance expectations and evaluation criteria. A company assigns a variety of duties and obligations to its employees based on their skillset, and performance is the outcome of the work that employees complete to fulfill those responsibilities (Rivaldo and Nabella, 2023). Businesses tend to continuously evaluate and measure employee performance, as high-performance employees enhance their competitiveness in the market (Wahyudi et al., 2022). This may encompass goals, standards of performance, performance reviews, and development opportunities. Clear expectations help employees understand their roles and responsibilities, align their efforts with organizational goals, and track their professional growth (SHRM, 2020).

Andalib et al. (2018) and Creswell (2013) emphasized rigorous analysis in qualitative data processes. NVIVO provided a reliable platform for analyzing and storing qualitative data, including reports and scholarly papers. According to Andalib (2018), the logic of replication was used during case analysis, where methodical procedures with multiple data sources—such as observations, transcripts, audio records, and annual reports—were replicated for each case. This systematic approach helped identify issues and finalize joint themes. Before conducting data analysis, several selection steps were taken, such as categorizing the codes, deriving and confirming the themes, Finalizing the theory, and designing the model by integrating it with block-chain components (Candy et al., 2020; Xu et al., 2019; Salah et al., 2020; Yi et al., 2020). 120 categorized codes have been detected while coding through NVIVO nodes in NVIVO tool, from those some significant ones are highlighted with significant excerpts in **Table 2** also.

Table 2. Themes, few significant excerpts, categorized codes and company wise variances.

Themes	Categorized Codes	Clustered Excerpts	Company	Variance
ESOP	White Collar	“Our higher management also follows formal, systematic procedures. Typically, we request a list of senior management candidates from headhunters before initiating the process.”	c1	Aligned
		“Guess, it’s not an issue to hire formally or with references, choosing the appropriate person for the required task is important for us.”	c8	Not Aligned
		“We first screen CVs, depending on mentioned skillsets, educational qualifications as per the required Job posting. The second step is to call the candidates for a written exam. Among this bunch, who performs well goes on to viva exams.”	c5	Aligned
		“Our recruitment team is highly efficient and aligned and they are doing a marvelous job.”	c5	Aligned

Table 2. (Continued).

Themes	Categorized Codes	Clustered Excerpts	Company	Variance
		“Our recruitment process takes usually 2 to 3 months.”	c5	Aligned
		“We have inaugurated this rigorous recruitment and selection process in Bangladesh.”	c6	Aligned
		“We conduct a workshop with new graduates in the first session. From there, we identify talents through several on-the-spot activities. The selected ones are called for interviews and written exams. We follow this aligned process every year.”	c6	Aligned
		“We follow a formal recruitment process for office executives.”	c2	Partially Aligned
		“At time, our recruitment team proposes to hire some candidates but most of the time top management approves who they think is right for the job.”	c3	Partially Aligned
		“Since we are not such an old company, we are still in a developing phase.”	c7	Not Aligned
		“We do not have any standardized recruitment system.”	c7	Not Aligned
		“I have already told you that we have a strict formal recruitment process and there is no scope of informal recruitment in our company, if we get any reference, we cancel that candidate’s name at first.”	c6	Never Occurs
		“We do not encourage or accept informal requests for recruitment. Especially for executives.”	c6	Never Occurs
		“Look we believe if we recruit anyone from references then we are doing injustice to a potential candidate.”	c5	Never Occurs
		“There is no question of recruiting anyone informally from any references.”	c5	Never Occurs
		“We do not take exams of the managers because managers are egoistic; so we casually invite them for tea or coffee, discuss with them to know about his working capability and experiences.”	c2	occurs
		“Usually we accept these proposals, because we believe. If the senior experienced person is hiring or referring anyone, he will have more interest to train him, teach him the job that needs to be done.”	c1	Partially occurs
		“But, this is not a usual process, we do randomly.”	c1	Partially occurs
		“Sometimes we tell them what kind of work we do, how he can contribute in our company and then we discuss and recruit informally.”	c2	occurs
		“Even though we give paper Ads for workers but many times, previous workers’ suggest us some people, so we recruit them.”	c8	Not Aligned
		“Our company follows a SOP guideline to recruit Labors.”	c1	Aligned
Blue Collar		“We train our labors for factory works.”	c1	Aligned
		“Our senior labors who are in the resignation phase or who are experienced with their skills usually refer someone from their families or known relatives whom he actually trains for the work, especially how he will handle the machines.”	c11	Partially occurs

Table 2. (Continued).

Themes	Categorized Codes	Clustered Excerpts	Company	Variance
		“Where will we go if our bosses do not hire us on references, we don’t have education background or any known people in this vast corporate world.”	c11	Partially occurs
		“For factory labors we accept recommendations.”	c2	Occurs
		“We usually recruit the labors from the locality and the workers who are working here sometimes bring their known people so that we can hire them for the work.”	c7	Occurs
		“Since, the factory works are very critical and sophisticated...we most of the time accept informal request of recruitment from the employees...and we feel more secure to hire from known references rather than from unknown places.... because these works are very tedious and need lots of secure processes...”	c7	Occurs
		“For some technical positions we accept references of our senior or experienced colleagues who know certain experts working in some other companies or might be working as a free lancer...sometimes we offer that person a job for a specific position...”.	c8	Occurs
		“We usually hire labors through both informal methods....”.	c8	Occurs
		“Our companies code of conduct is written where do’s and don’ts are mentioned as a guideline.”	c3	strongly existent
		“Employees who are recruited are provided codes of conduct of the company and also their JDs along with a documented to-do list along id cards and other necessary stuff.”	c3	strongly existent
		“Of course, we strictly follow the code of conduct.”	c6	strongly existent
		“At first, we get the contract signed by the employed person and then only we provide the person with compliance documents.”	c6	strongly existent
		“Since, we are progressing only so not everything is implemented yet.”	c10	Weakly existent
		“We factory workers feel only we have to abide by rules.”	c8	Weakly existent
	Code of Conduct	“Indeed, protocols are for all the employees but since, we have so many offices, usually the mandatory ones without which audit cannot be done are mainly applied.”	c8	Weakly existent
		Sorry, we don’t have any written code of conduct but we tend to have one.	c2	Not Existent
		“Yes, unwritten rules & regulations we have but not completed yet.”	c9	Not Existent
		“Actually, in our company even though there is no code-of-conduct (COC), however we’ve created a guideline, which is still like premature baby. Employees are employed for a probation period normally, then they are recruited in the production team.”	c2	Not Existent
		“We do not have any written code of conduct but when the employees start working they automatically get adjusted to the environment.”	c9	Not Existent

Table 2. (Continued).

Themes	Categorized Codes	Clustered Excerpts	Company	Variance
ESOP	Job Description	“Since we are quite a large company, it is difficult to record.”	c10	Weakly existent
		“Job Description for each employee is fixed but in the corporate arena, an employee has to work beyond the works mentioned in his/her specific JD.”	c2	Not Existent
	Basic Pay	“Yes, we receive a festival bonus twice a year, which is equivalent to our basic pay.”	c5	High
		“As Top mgt we know that Employees are satisfied with payment.”	c5	High
	House Rent	“Basic allowance does not show many components.”	c9	Low
		“Housing is there but transportation is not for all. There is transport for senior personnel and for the very important officials...”	c2	Average
		“We give Basic remuneration, house rent, conveyance, medical facilities, festival bonus, two festival bonuses.”	c2	Average
	Transportation	“Sometimes, employees want transportation but for such a large number it is not becoming possible.”	c3	Average
		“Sometimes, employees want transportation but for such a large number it is not becoming possible.”	c3	Average
	Provident Fund	“The company provides a provident fund, although it is not mandatory according to Bangladesh Government Labor Law.”	c12	strongly existent
		“The company offers a provident fund to the employees who are permanent and full-time workers and have completed five years of service.”	c12	strongly existent
		“I am not completely sure about the appropriateness of Provident Fund (PF), gratuity, and Workers’ Profit Participation Fund (WPPF) benefits in the company.”	c2	Weakly existent
	Gratuity	“Yes, we offer gratuity for our employees. The calculation process starts after five years of service, and employees can collect it either at that time or later, usually upon resignation.”	c5	strongly existent
		“Employees must prove themselves to become permanent.”	c8	moderately existent
“Employees who work for 10 years are eligible to get gratuity.”		c8	moderately existent	
WPPF	“We have Workers’ Profit Participation Fund (WPPF) as per Bangladesh Labour Act (BDL) guidelines, but the exact calculation depends on the 5% profit specified by the government. Now, 5% profit on what?”	c2	Weakly existent	

Table 2. (Continued).

Themes	Categorized Codes	Clustered Excerpts	Company	Variance
MR	Accident	“One of my colleagues had his hand cut by a machine. The company paid for his medical treatment and covered all costs.”	c6	strongly existent
		“Because he could no longer work, his wife was hired in another field as compensation.”	c6	strongly existent
		“Accidents are rare, but when they occur, we provide support, although we do not follow any specific guidelines for this. We are developing them.”	c2	Weakly existent
	Maternity	“Yes, have got Maternity benefits for 6 months according to Bangladesh Labour Act (BDL).”	c1	strongly existent
		“We give maternity leave for 3 months but not yet insurance—we are still developing the system.”	c2	Weakly existent
	Health Insurance	“You can do a probing and see that not many companies provide health insurance plan but we do provide it for our employees.”	c1	present
		“We have health insurance but if the employees are inpatient and hospitalized.”	c4	partially present
		“We have health insurance for hospitalized employees but depends on designation.”	c3	partially present
	Termination Policy	“Either the company or the employee needs to provide a one-month-notice prior to termination, so no uncertainty can be observed to lose a job suddenly.”	c3	Sense of Security
		“Often, workers leave their jobs when the project they were working on is completed.”	c7	Lacking Security
		“Employees’ leave when their projects are finished.”	c7	Lacking Security
	Gender Bias	“We cannot take females in the factory because it is of heavy machineries’ works.”	c9	Sense of Security
Leadership Styles	“No other company will take the load to coach and train the employees to a level where they become specialized in unique areas and it happens because our leaders and managers are cordially supportive and dynamic.”	c6	Transformational	
	“Top Management’s are applied by our leaders.”	c11	Transactional	
	“Only top management can provide opinions about various things to the outsiders.”	c3	Transactional	
CA	Government	“Indeed, we apply the government’s regulations and compliances but sometimes it creates obstacles to our business growth too.”	c2	Major
		“When due to political changes something change, that becomes a headache for us.”	c5	Major
		“We do our best to comply and be number one compliant firm in the market.”	c1	Minor
		“International Organization for Standardization (ISO) standardizations we have too, we also comply with that. But, complying with government compliances are our prime focus.”	c1	Minor
		“Our workflow is guided by the ethical notion and corporate governance.”	c1	Minor

Table 2. (Continued).

Themes	Categorized Codes	Clustered Excerpts	Company	Variance
OVMSS	Objectives	“Employees expect rewards, nevertheless we will provide rewards only to the achievers.”	c3	result oriented
		“Our products remain highly desired, which is a result of consistency at work.”	c3	consistency
		“Employees love our product and the company so they are automatically hard working.”	c4	sense making
	Philosophies	“We are aggressive for the market, so at times, we create and apply new policies to gauge employees’ responses.”	c4	sense making
		“Our employees feel like family and they are with us for many years.”	c3	consistency
	Beliefs and Values	“Our employees have complete concentration, dedication and a consistent mindset that is why they are with us for several years.”	c11	consistency
EG	HRM Action Points	“We have a detailed HRM portfolio.”	c6	compliant
		“HRM team is quite effective and efficient.”	c6	compliant
		“Our HRM team is a very large one and we have developed 13 core action points for HRM.”	c1	compliant
		“We have HRM policy set my Govt. rules.”	c11	Partially compliant
		“We wish to develop the standardized HRM policy.”	c9	Less compliant
	HRM Tools	“We are trying to develop an in-house HRM app.”	c11	Partially compliant
		“I don’t know much about these tools.”	c9	Less compliant
		“Our company has in-house HRM software.”	c1	compliant
		“Unfortunately, we do not have any HRM tool, yet we are trying to develop one in-house.”	c2	Less compliant
		“We do not compel them to work when they take leaves.”	c3	included
OVMSS	Articles	“We provide health insurance, and we try to provide employees a good and secure working environment.”	c1	included
	conventions	“We only apply some BDL Labor Law which are mandatory only.”	c2	partially included
		“We apply the Trade Union policy for our factory workers only.”	c1	included
	sections	“We follow Bangladesh Labor Code, where it’s said that we must give 6 months maternity with pay leaves to the female workers.”	c8	not included
		“We have our own SOP that we are an ISO certified company. we are ISO 2008:9001.”	c8	not included
		“Trade union exists for blue collar jobholders.”	c1	included

3. Results

Miles, Huberman, and Saldana’s 2014 techniques were employed to identify patterns within each code and theme. Auerbach and Silverstein noted that categorizing and grouping components were based on soft coding, which validates and justifies the data with generalizability, a process also supported by Andalib (2018). The findings were systematically summarized from published articles to facilitate comparison. Firstly, the literature on organizational compliances was reviewed, identified, and

sorted. Secondly, data from case participants were generated and coded using NVIVO. Thirdly, the soft systems technique was applied to merge and refine themes such as manufacturing regulations (MR), Company Act (CA), Employees’ Guidelines (EG), and Organizations’ Vision, Mission, Structure and SOP (OVMSS), which are compliance outcomes for all human resources and Employees Standard Operating Procedures (ESOPs) within the company (ILO, 2012). During interviews, participants were questioned about various aspects of manufacturing companies’ compliance, acknowledging the challenges in validating qualitative research (HoonLee et al., 2013). **Table 3** Company Versus Participants’, shows how many participants participated in this research setting from distinct companies.

Table 3. Company versus participants.

Company	Participants Number	Type of Employees’
Company 1	8	Top Management & Union Representatives
Company 2	5	Top Management
Company 3	11	Top Management, Mid Layer Management & Union Representatives
Company 4	7	Top Management & Mid Layer Management & White-Collar Employees
Company 5	8	Top Management & Mid Layer Management & White-Collar Employees
Company 6	9	Mid Layer Management & Union Representatives
Company 7	10	Mid Layer Management, White Collar Employees & Union Representatives
Company 8	6	Mid Layer Management & Union Representatives
Company 9	8	Top Management, Union Representatives & Blue-Collar Employees
Company 10	3	Top Management
Company 11	7	Top Management, Union Representatives & Blue-Collar Employees
Company 12	5	Top and Mid Layer Management

Table 3 shows most of the employees interviewed belong to the top management. In **Table 4**, In-depth Interview has derived few focused themes, which are manufacturing regulations (MR), Company Act (CA), Employees’ Guidelines (EG), Employees Standard Operating Procedures (ESOP) and Organizations’ Vision, Mission, Structure and SOP (OVMSSS). Here, Organizational HRM Compliances for each case have been measured as Compliant, Partially Compliant and less compliant. Outcome of each case ‘HRM compliances’ is either compliant or less Compliant’. **Table 4** Themes of OC with Variances and Outcome reveals the in-depth interview analysis of Manufacturing Companies’ compliances of the organizations for the employees’, where companies 1,4,5 and 6 are compliant but other companies 2, 3, 7, 8, 9, 10, 11 and 12 are less compliant. Here, Compliant (Comp) is rated as ‘++’ and Less compliant (LComp) is rated as ‘+’.

Table 4. Themes of OC with variances and outcome.

Themes of OC	MR	CA	EG	ESOP	OVMSS	Outcome
Company 1	“++”	“++”	“++”	“++”	“++”	Comp
Company 2	“+”	“+”	“+”	“+”	“+”	LComp
Company 3	“+”	“+”	“+”	“+”	“+”	LComp

Table 4. (Continued).

Themes of OC	MR	CA	EG	ESOP	OVMSS	Outcome
Company 4	“++”	“++”	“++”	“++”	“++”	Comp
Company 5	“++”	“++”	“++”	“++”	“++”	Comp
Company 6	“++”	“++”	“++”	“++”	“++”	Comp
Company 7	“+”	“+”	“+”	“+”	“+”	LComp
Company 8	“+”	“+”	“++”	“++”	“+”	LComp
Company 9	“+”	“+”	“+”	“+”	“+”	LComp
Company 10	“+”	“+”	“+”	“+”	“+”	LComp
Company 11	“+”	“+”	“+”	“+”	“+”	LComp
Company 12	“++”	“++”	“++”	“++”	“++”	Comp

Table 5 below showcases the outcomes as well from its evidence of FGD transcripts, where it seems like four companies are considered compliant, but others are not.

Table 5. Focused themes of organizational compliance.

Company	Evidence from Transcript	Participant	Rate	Final Outcome
Company 1	“++”	“++”	“++”	Comp
Company 2	“+”	“+”	“+”	LComp
Company 3	“+”	“+”	“+”	LComp
Company 4	“++”	“++”	“++”	Comp
Company 5	“++”	“++”	“++”	Comp
Company 6	“++”	“++”	“++”	Comp
Company 7	“+”	“+”	“+”	LComp
Company 8	“+”	“++”	“+”	LComp
Company 9	“+”	“+”	“+”	LComp
Company 10	“+”	“+”	“+”	LComp
Company 11	“+”	“+”	“+”	LComp
Company 12	“+”	“+”	“+”	LComp

In the **Table 2**, researchers have pointed out the clustered excerpts along with the categorized codes. The excerpts are coded in NVivo as quotes and open codes and then these open codes are later grouped as categorized codes. In **Table 6**, company-wise excerpts are shown and also each quote-wise found variances are also mentioned. For example, the white collar is a grouped categorized code where nineteen (19) significant excerpts are disclosed as per distinct companies. Moreover, each excerpt has been marked with a variance that has been identified by the researchers in here too. For white-collar categorized code researchers have found aligned, not-aligned, never occurs, partially occurs, and occurs variances. Categorized code “Blue collar” ten (10) significant excerpts where identified variances are not aligned, occur, partially occur etc. Just like this, another categorized code-named “code of conduct” disclosed eleven (11) significant excerpts in here, where strongly existent, weakly existent and existent variances are observed. Job Description is termed as one categorized code where two

(2) significant excerpts are shown with weakly existent or existent variances. Researchers have grouped these four categorized codes into a theme named “Employees Standard Operating Procedures (ESOP)”. In the following **Table 6**, researchers also disclosed four (4) excerpts that define HRM Aps named as the categorized code. Also, Two (significant) excerpts that define HRM guidelines and four (4) significant excerpts that define HRM tools as the categorized code are also observed where variances are compliant, partially compliant or less compliant. Eventually, these categorized codes come together to form the theme named “Employees’ Guidelines (EG)”. From **Table 6**, some other categorized codes named Strategies, Objectives, Articles, conventions, sections, beliefs & values can be viewed which has shown consecutively few significant excerpts two (2), four (4), two(2), one(1), four (4), two(2) and four (4) with variances result oriented, consistency, sense-making, lacking sense, included, not included, partially included and grouped these categorized codes into the theme named “Organizations’ Vision, Mission, Structure and SOP (OVMSS)”.

The below **Table 6** shows the NVIVO Nodes (Categorized Codes) and NVIVO references (OC) derivation by using the tool NVIVO. The detailed NVIVO nodes (categorized codes) can be observed from **Table 6**. The themes derived from the categorized codes are also seen.

Table 6. Themes, NVIVO codes (categorized codes), NVIVO references (open codes).

Themes	NVIVO Nodes (Categorized Codes)	NVIVO Open Codes
ESOP	White Collar, Blue Collar, CoC, JD	11, 10, 11, 2
ESOP	Basic Pay, House Rent, Transportation, Providend fund, Gratuity, WPPF	3, 2, 4, 4, 3, 7, 3
MR	Maternity, Health Insurance, Accident, Overtime, rewards	3, 3, 4, 2, 1
MR	Gender Bias, Social Exposure Management Styles, Leadership Styles, Trust, Org. Commitment	3, 2, 1, 2, 1, 1
CA	Politics, Legal, Corporate Governance, Government	1, 1, 1, 2
OVMSS	Objectives, Articles, conventions, sections, beliefs & values	2, 4, 2, 1, 4, 2, 4
EG	HRM Aps, HRM Guidelines, HRM Tools, Code of Conduct and Ethics, Workplace Policies, Health and Safety Guidelines, Communication and Collaboration, Performance Expectations	4, 2, 4

In the above-mentioned **Figure 1** named Dataset-1 and Nodes one of the main datasets is referred to and its nodes are also mentioned in a visual format. There are a few other datasets as well as supplementary transcription files and text memos from which certain nodes are also generated. Nevertheless, this diagram shows a singular dataset with its related nodes.

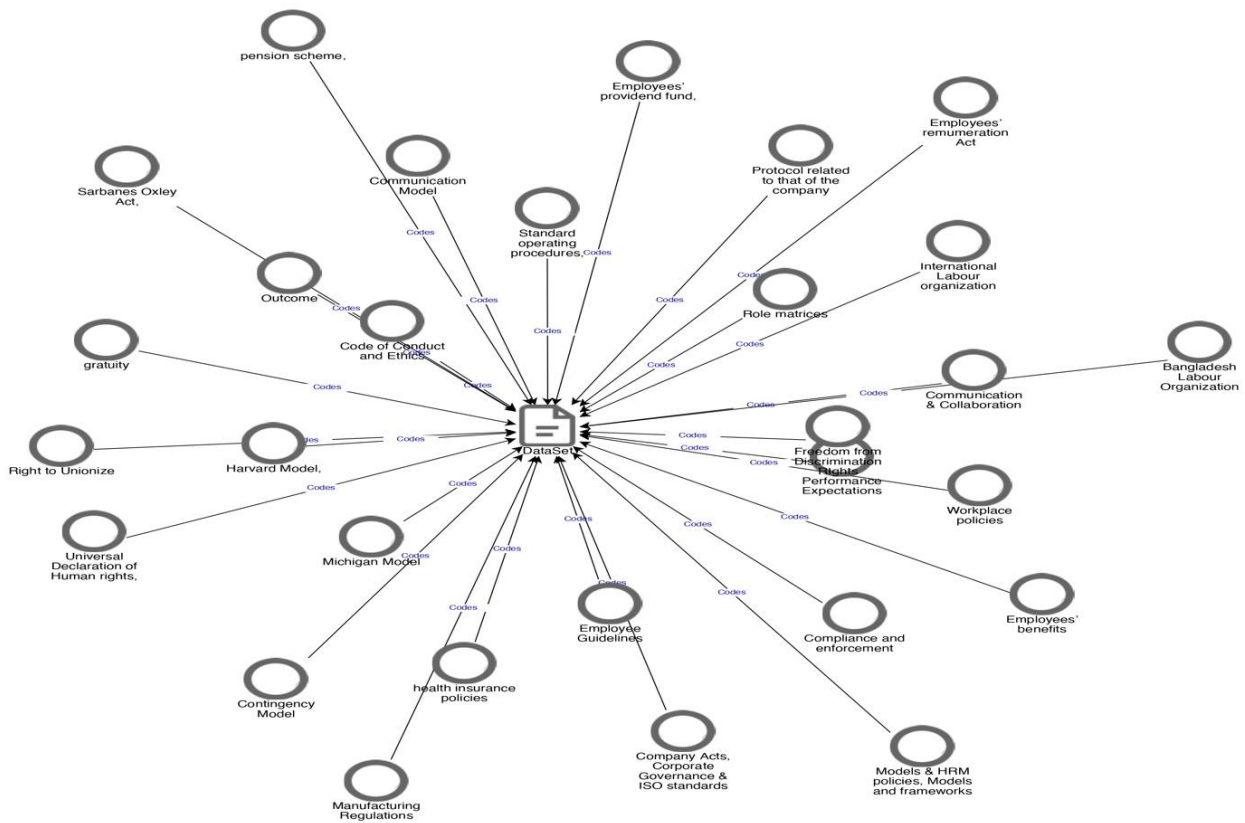


Figure 1. Dataset-1 and Nodes (NVivo).

The below Figure 2 named “Nodes Grouped in Color (NVivo)”.

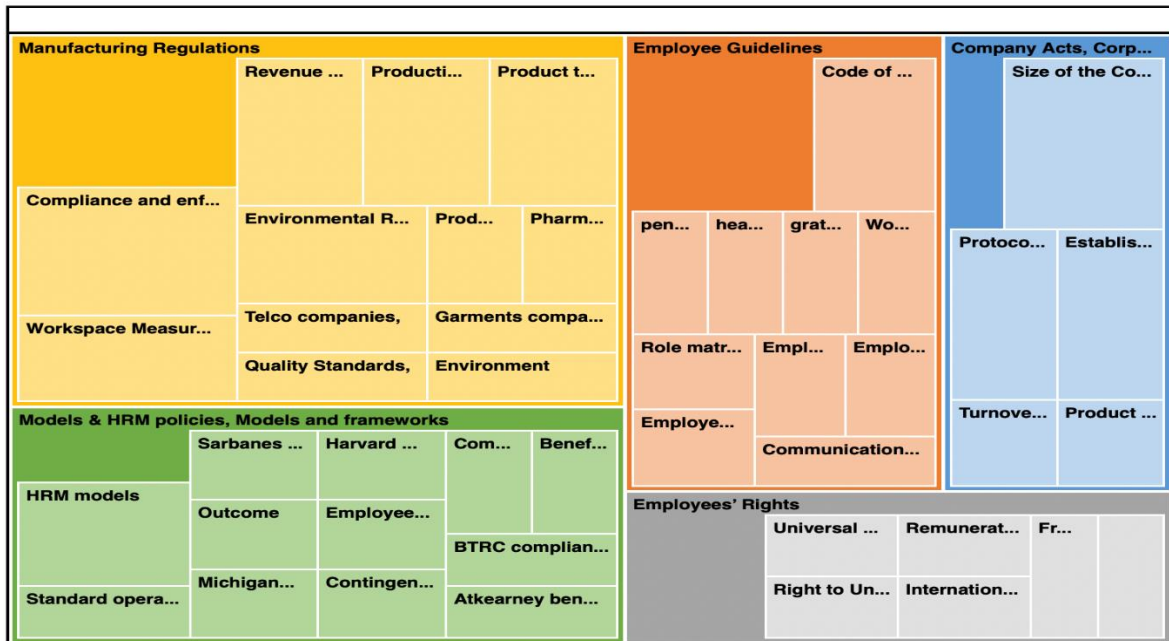


Figure 2. Nodes grouped in color (NVivo).

Below Figure 3 discloses the NVivo pseudo nodes grouped from consecutively open codes and categorized codes from a few different datasets compiled in five particular files. The nodes are aggregated into references for each pseudo-node.

Name	Files	Refer...
> ○ Company Acts, Corporat...	3	35
> ○ Employee Guidelines	3	91
> ○ Employees' Rights	5	27
> ○ Manufacturing Regulations	5	29
> ○ Models & HRM policies,...	4	27

Figure 3. Themes from datasets (NVivo tool).

Data validation has been conducted by triangulation studies, where data from both scholarly articles and from primary evidence are cross-matched and brought to a few common themes. As per Auerbach conformability, reflexivity, justifiability and transferability techniques primary data are validated.

In below **Figure 4**, Researchers have proposed a Smart Unified Organizational Compliance Model, where all these five (5) themes are addressed along with the Categorized codes (CC) on the other hand, Organizations’ particular information like employees’ size, their KSAs, and Experiences are brought in, their remuneration packages along with entire role matrix is observed besides the organizations’ size, their establishment year, workspace measurement as in the kind of environment and the location they reside is showcased and the kind of products they produce are sorted out as well. All of these are unified with the previously discussed themes.

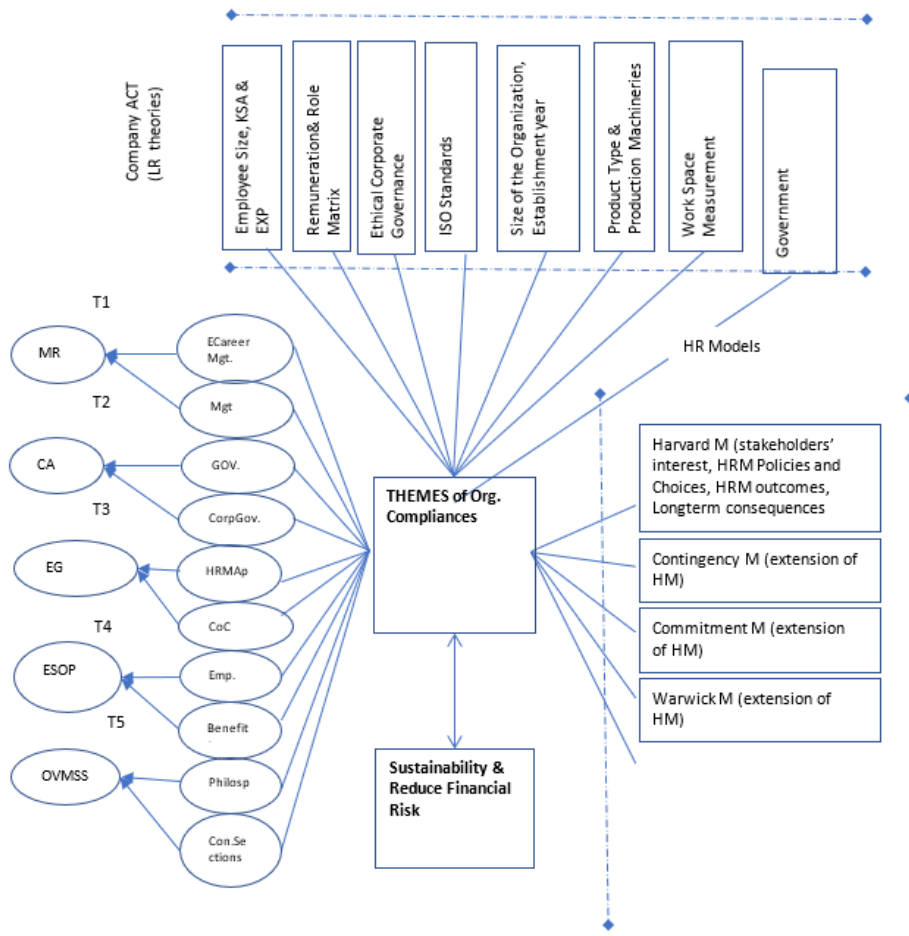


Figure 4. Proposed smart unified organizational compliance model (SUOCM).

Finally, the HR model whichever is the most suitable one like the Harvard model that focuses on stakeholders' interests, situational factors, HRM policies and choices, HRM outcomes and Long-term consequences developed by Beer and colleagues like or the extended versions of Harvard models like the contingency model or commitment model, outcome model, or guest model is included in this standalone model. This unification directly impacts the sustainability of the organization as well as reduces the financial risk in the long run.

The Harvard Model of Human Resource Management stands out due to its comprehensive approach, taking into account various factors that contribute to successful HRM (Beer et al., 1984). Central to this model are four main areas: Stakeholder Interests, Situational Factors, HRM Policies and Choices, and HR Outcomes. Each of these elements is crucial in forming the HR strategy and practices within an organization, ensuring alignment with broader business goals and employee needs. By exploring these components, the Harvard Model offers a systematic method for understanding and applying HR practices that promote both organizational objectives and employee well-being.

4. Discussion

The integrated model can resolve a lot of hassle and make HR managers' life easier in the manufacturing companies. The figure above shows the integrated compliance model is the solution to this problem. Whenever, all the segregated compliance models are brought under one umbrella financial. Previous researchers have discovered through exploration and analysis that certain essential factors are crucial for the success of manufacturing organizations. Consequently, scholars such as Nam and others have established models for manufacturing organizations that encompass three primary dimensions: the integration of infrastructures and technology-mediated services, social learning to enhance human infrastructure, and governance for institutional improvement and employee engagement (Andalib et al., 2022; Onwuegbuzie, 2009; Trong, 2002; Trong; 2020).

In this paper, researchers have focused on people and manufacturing organizations, where the machineries come after the machine users as in the employees with their core rights and roles abide by the compliances of the organizations. Unification will bring benefits in certain areas to improve organizational compliance. **Table 7** displayed the themes that would have certain propositions after unification. HRM Compliances mainly build up organizational compliance and therefore, evidence of this study related to excerpts of HRM compliance themes are mentioned below which has been discussed by Andalib in 2018. Long back, in 1994 Lado and Wilson mentioned a few policies and practices of HRM, that facilitate a constant competitive advantage, which are organizational knowledge generation, complex social relationships and etc. As per Barney (2001), HRM practices must be central to the organizational strategy. Some excerpts below can provide a clear vision. The below **Table 8** shows Participant 1 from company 4 (P1C4) and Participant 2 from company 1 (P2C1).

Table 7. Themes versus unification propositions.

Themes	Unification would lead to certain propositions
OVMSS (Organizations' Vision, Mission, Structure & SOP)	(Organization Culture) Adaptability Culture = more external focused 1.Philosophies related to Artefacts would be in an expansion stage with the presence of necessary equipment and organized database. Espoused Values would care for the employees by encouraging and appreciating their performances. Fundamental assumptions would talk about employees' ability to make sense. 2.Employees' rights inclusions are observed
MR (manufacturing regulation)	(Management Style) Transformational = Leaders focusing on relationship building. 1.1. Leadership Style would create the Dynamic atmosphere to improve relationship. 2.Good Governance would be provided where management would focus on the work environment besides economic prosperity. (Employees' PMP & Career Management) High Capability =employees' having a career path and direction of their own lives 1.Rigorous training & development mechanisms would be established 2.Employees would have a Sense of job Security and feel satisfied at workplace
ESOP (Employees Standard Operating Procedure)	(Recruitment & Selection & Compensation Packages) Established = Flow chart implemented and steps implemented. Human Oriented = Employees' need based packages developed. 1.Non-referral Recruitment would be the prime process and perfectly Aligned whereas Referral Recruitment would be quite less and at times would be Not applicable. 2.BasicMonthlyPackage would be high, Situational Benefits would be strongly existing along with Long Term Benefits would be observed strongly.
EG (Employees Guidelines)	(HRM Policy, Tool and APs) 1.HRM tool & Action Points would be established and implemented 2.Integration with Harvard model's factors would be implemented.
CA (Company Act)	(Government and Competitors) Organizational Compliances= Management would apply and stay compliant 1.Govt. policies would be compliant & ISO standards would be implemented. 2. Corporate Governance would be implemented.

Table 8. Significant Excerpts focusing on Org. HRM practices and Org. compliances.

Participant	Excerpts	Categorized Codes	Themes
P1C4	“Some protocols of HRM Policy are customized in-house and some are outsourced. Steps to apply HRM policies are engraved from a consultant’s perception with a slight modification.”	HRM action plan, HRM practices and HRM guidelines	Organizational HRM practices, Organizational compliances
P2C1	“In our organization, Our HRM policy has got 13 significant Action plans, which are documented and organized accordingly.”	HRM Action plan	Organizational HRM practices, Organizational compliances

Therefore, scholars have also come up with the characteristics of the integrated organizational values which indicate that company having these values are compliant and are sustainable for the long run. Various predictions about future research can be done, particularly about manufacturing organizations of any particular region can be brought under scrutiny for qualitative to analyze the conditions and thinking about the potential re-engineering. Furthermore, researchers can conduct empirical studies to cross-check the pattern of customized re-engineered compliance models which are implemented at various organizations (González-Gómez, 2023; Yi, 2020). In near future, researchers could perform extensive qualitative approach-oriented studies

within particular industries in Bangladesh or other countries to examine the detailed condition-wise consequences regarding the manufacturing companies' adherence to departmental or divisional work provisions, allowing for potential unification. Additionally, scholars could conduct surveys and empirical studies which can be conducted after the implementation of the unified compliance model to evaluate its impact on the organization (González-Gómez, 2023; Yi, 2020). Surveys at the managerial level could also be conducted to determine if the re-engineered component has improved decision-making capabilities and autonomy. Multiple case studies, as well as distinct single case studies, can be conducted to observe the existing conditions of any manufacturing companies of the world besides of Bangladesh.

5. Conclusion with contribution

Andalib and Darun discussed in 2018 that single-end models or frameworks design the built-in policies and practices within the model instead of using separate or segregated rules. Scholars like Guest (1997) also have put much effort into developing sophisticated models of manufacturing companies for managing various operations, human resources, financial issues, and corporate governance etc. (Foortis and Rik, 2011; Fox et al., 1999; Ogbeibu et al., 2024; Onwuegbuzie et al., 2009). This model attempts to focus on the sustainability of the organization by reducing financial risks of the organization. Nevertheless, the compliance model here is integrated to extract data easily with the multi-layer design helps it not only to extract it in a segregated manner but also the combination of multiple upgradations can help it to generate the combined data to work on the specific raised issue at that point of time. Previously, few scholars have tried to apply this method to HRM practices and policies where re-engineering has been done using the HRM data of the manufacturing companies of Bangladesh. The continued study of the integration of other HRM components with can be observed at the framework from Andalib and Darun (2018). HoonLee et al. (2013) talked about the case-wise analysis and integration of the manufacturing companies and their compliances where themes are generated from detailed levels of coding, and categorization of codes implementing the soft-systems method.

Meanwhile, for data validation purpose, Miles et al. (2014)'s participants' confirmation of data is one of the key techniques for cross-checking accuracy. However, it has been quite a tedious process besides mitigating the constraints from time to time. In this research, several themes are discovered after comprising several variations of categorized codes, which had the dominating value in designing the model. Researchers applied ontological paradigms to comprehend the findings in logical ways (Creswell and Crewell, 2022). Finally, this study ended with a standalone compliance model to reduce financial risks as well as some futuristic directions toward sustainability.

The manufacturing industry, therefore, with its elaborate operations, supply chains, and regulatory frameworks, faces significant financial risks and challenges on sustainability. In this context, an ontological perception-driven smart unified organizational compliance model could serve as a workable milestone in mitigating risk while fostering long-term sustainability (Grubic and Jennions, 2018). As per (Grubic and Jennions, 2018) In the context of information systems, ontology refers to

the formal representation of knowledge in a particular domain. Compliance in manufacturing could, within an ontological approach, offer the possibility to embed regulatory, financial, and sustainability parameters within one model that ensures observance of regulations, optimization of financial decision-making, and sustainability. In the ontological perception, a structured framework is used to organize compliance requirements, risk factors, and sustainability goals. This leads to better decision-making.

An organization can come closer to leading-edge operational processes with financial risk management approaches using a smart unified compliance model that enables them to fulfill the requirements of predefined compliance standards for every action and decision taken. The model can further integrate real-time data analytics, machine learning, and AI in a continuous monitoring and adjustment process to respond to changes in regulation and financial risk at a lower probability of non-compliance with financial penalties or operational inefficiencies. The model, from the perspective of sustainability, encourages good resource management, reduced environmental impact, and adherence to rules governing environmental standards to be part of achieving the CSR objectives (Hassini et al., 2012).

Manufacturing organizations, due to the emergence of new environmental regulations and stakeholder demands, are compelled to increasingly include sustainability within their practices. By embedding sustainability within the ontological structure, organizations can strive for better utilization of inputs by minimizing waste, increasing efficiency, and adhering to relevant environmental laws, which can reduce potential risks to the bottom line arising from environmental liabilities. It can also widen the intelligent capabilities of the model for financial forecasting using the metrics of sustainability, enabling organizations to predict in advance certain risks that might come from regulatory changes or environmental hazards.

The intelligent compliance model not only ensures that the regulatory requirements are fulfilled but also allows the identification of cost-saving opportunities and efficiency enhancements, thereby aligning the operations of the firm with long-term sustainability goals. As stated by Taticchi et al. (2013), integrating compliance and sustainability objectives through an ontological model will enable manufacturing companies to reduce risks related to financial penalties, while also improving operational efficiency and increasing competitiveness in the market.

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