0.1 Parameters

0.1.1 Labor Force

- $\text{Demography}_{g,t}$: Demographic information for geographic area g at time t.
- $\text{Geography}_{g,t}$: Geographic information for area g at time t.
- $\text{IndustryDemand}_{j,t}$: Demand for industry j at time t.
- $\text{CustomerDemand}_{j,g,t}$: Customer demand for industry j in geographic area g at time t.
- $\text{Productivity}_{i,t}$: Productivity of individual i at time t.
- $\text{ProductivityIndustry}_{j,t}$: Productivity of industry j at time t.
- $\text{TechGap}_{i,t}$: Technical gaps and relative conversion time for individual i at time t.
- $\text{PersonalityTraits}_{i}$: Personality traits of individual i.
- $\text{AcademicRequirements}_{i}$: Academic requirements of individual i.
- $\text{KnowledgeNetwork}_{i}$: Individual knowledge and social network of individual i.
- $\text{IndustryFlexibility}_{j,t}$: Flexibility of industry j at time t.
- $\text{HiringSensitivity}_{j,t}$: Hiring sensitivity of industry j at time t.
- $\text{DemandVolatility}_{j,t}$: Demand volatility of industry j at time t.

0.1.2 Public Expenses

- $\text{PublicAdminProductivity}_{j,g,t}$: Public administration productivity for sector j in geographic area g at time t.
- $\text{IncentiveSchemes}_{j,g,t}$: Incentive schemes in place for sector j in geographic area g at time t.
- $\text{FinancialTransactions}_{j,g,t}$: Financial transactions for sector j in geographic area g at time t.
- $\text{OperativeTransactions}_{j,g,t}$: Operative transactions for sector j in geographic area g at time t.
- $\text{ExpectedQuality}_{j,g,t}$: Expected quality needed for sector j in geographic area g at time t.
- $\text{ExpectedServices}_{g,t}$: Expected products and services acquired by welfare receivers in geographic area g at time t.
- $\text{Location}_{j,g,t}$: Location of sector j in geographic area g at time t.
- $\text{Relocation}_{i,t}$: Availability to relocate for individual i at time t.
- $\text{CrossTraining}_{i,t}$: Cross-training capacity of individual i at time t.
- $\text{Bottlenecks}_{i,t}$: Individual and community bottlenecks for individual i at time t.

  In this section, various parameters related to labor force and public expenses are listed. These parameters are considered predetermined or fixed values that are used to define the relationships between variables or to specify constraints in the model.

  Here's the section focused on composed identities and functions, with the direct parameters removed:

1 Knowledge Representation

This section covers the knowledge representation aspect, which includes composed identities and functional relationships that capture the underlying knowledge and dynamics of the system.

1.1 Individual Workers

– $\text{LearningCapacity}_i = \text{LearningCapacity}(A_{i,t}, \text{EducationalBackground}_i)$: Learning capacity of individual i, based on age and educational background.

1.2 Major Industries and Companies

– $\text{RegulatoryProductivity}_{j,t} = \text{RegulatoryProductivity}(j,t)$: Relationship between regulatory sophistication and productivity for small-medium business in industry j at time t.

1.3 Services and Benefits

– $\text{ServiceQuality}_{j,g,t} = f(\text{ServiceProductivity}_{j,g,t}, \text{EconomyOfScale}_{j,g,t})$: Service quality of service provided by sector j in geographic area g at time t, as a function of productivity and economy of scale.

1.4 Relationships between Knowledge Factors

* $\text{LearningCapacity}(A_{i,t})$: How age affects learning capacity for individual i at time t.
* $\text{RegulatoryProductivity}(j,t)$: Relationship between regulatory sophistication and productivity for small-medium business in industry j at time t.
* $\text{NetworkingEfficacy}(M_{i,t})$: Efficacy of networking events by personality traits $M_{i,t}$ of individual i at time t.
* $\text{WorkerMatching}_{i,j,t} = g(\text{Preferences}_i, \text{LearningCapacity}_i, \text{RegulatoryProductivity}_{j,t}, \text{NetworkingEfficacy}(M_{i,t}))$: A composed identity representing the suitability of matching worker i with industry j at time t, based on preferences, learning capacity, regulatory productivity, and networking efficacy.

2 Reasoning

Reasoning, in the context of this framework, can be viewed as searching across the knowledge space to achieve the desired objective. It involves exploring the possible set of combinations and finding the best possible resource balance or allocation that optimizes the goal while satisfying the constraints. The reasoning process involves identifying the decision variables controllable via a public policy and evaluating the cost or reward associated with each decision and given state or scenario.

2.1 Decision Variables

Decision variables are the controllable factors that can be adjusted or manipulated through public policy decisions. These variables differ from parameters, which are predetermined or fixed values used to define relationships or specify constraints. Some examples of decision variables in LaTeX notation are:
- $\tau_{i,t}$: Custom tax rate for individual i at time t.
- $E_{j,t}$: Amount of events and knowledge-sharing sessions for industry j at time t.
- $T_{j,t}$: Professional training schemes for industry j at time t.
- $I_{p,t}$: Investment or disinvestment in academic program p at time t.
- $I_{t,t}$: Investment in tech infrastructure at time t.
- $I_{w,t}$: Investment in psychophysical wellness incentives at time t.
- R_t: RD custom amortization policy at time t.
- $C_{i,j,t}$: Cross-training opportunities for individual i in industry j at time t.
- $A_{j,t}$: Number of local automation clusters for industry j at time t.

These decision variables can be adjusted or controlled through public policy decisions to achieve the desired objectives and balance resource allocation.

2.2 Reward/Cost Modeling

Modeling rewards and costs accurately is crucial for successful reasoning. It involves evaluating the benefit or detriment associated with each decision variable and state using a combination of quantitative and qualitative approaches, aligned with environmental, social, and economic goals.

· **Quantitative Evaluation:**
· NPV, IRR, Payback Period, Cost-Benefit Analysis
· Incorporate environmental costs: carbon pricing, emissions penalties
· Example: NPV of $I_{t,t}$ (tech infrastructure investment) factors in energy efficiency, emissions reduction
· **Qualitative Guidelines:**
· Expert knowledge, historical data, societal goals
· Social impact, inclusion, diversity, accessibility
· Example: Guidelines for $C_{i,j,t}$ (cross-training) consider disability accommodation, diversity targets

Combining quantitative and qualitative approaches enables holistic modeling of rewards and costs, incorporating financial, environmental, and social factors.

· **Environmental Rewards/Costs:**
· R_t (R&D amortization policy): Reward green tech R&D, penalize emissions
· $I_{w,t}$ (wellness incentives): Reward active transportation, penalize car commuting
· **Social Rewards/Costs:**
· $\tau_{i,t}$ (custom tax rate): Reward inclusive hiring, penalize discrimination
· $E_{j,t}$ (knowledge-sharing events): Reward diversity, penalize exclusion

By fine-tuning rewards and costs based on environmental and social impact assessments, the reasoning process can identify optimal resource allocations that reduce CO2 emissions, increase inclusion, support people with disabilities, and sustain diversity, while maximizing desired objectives.