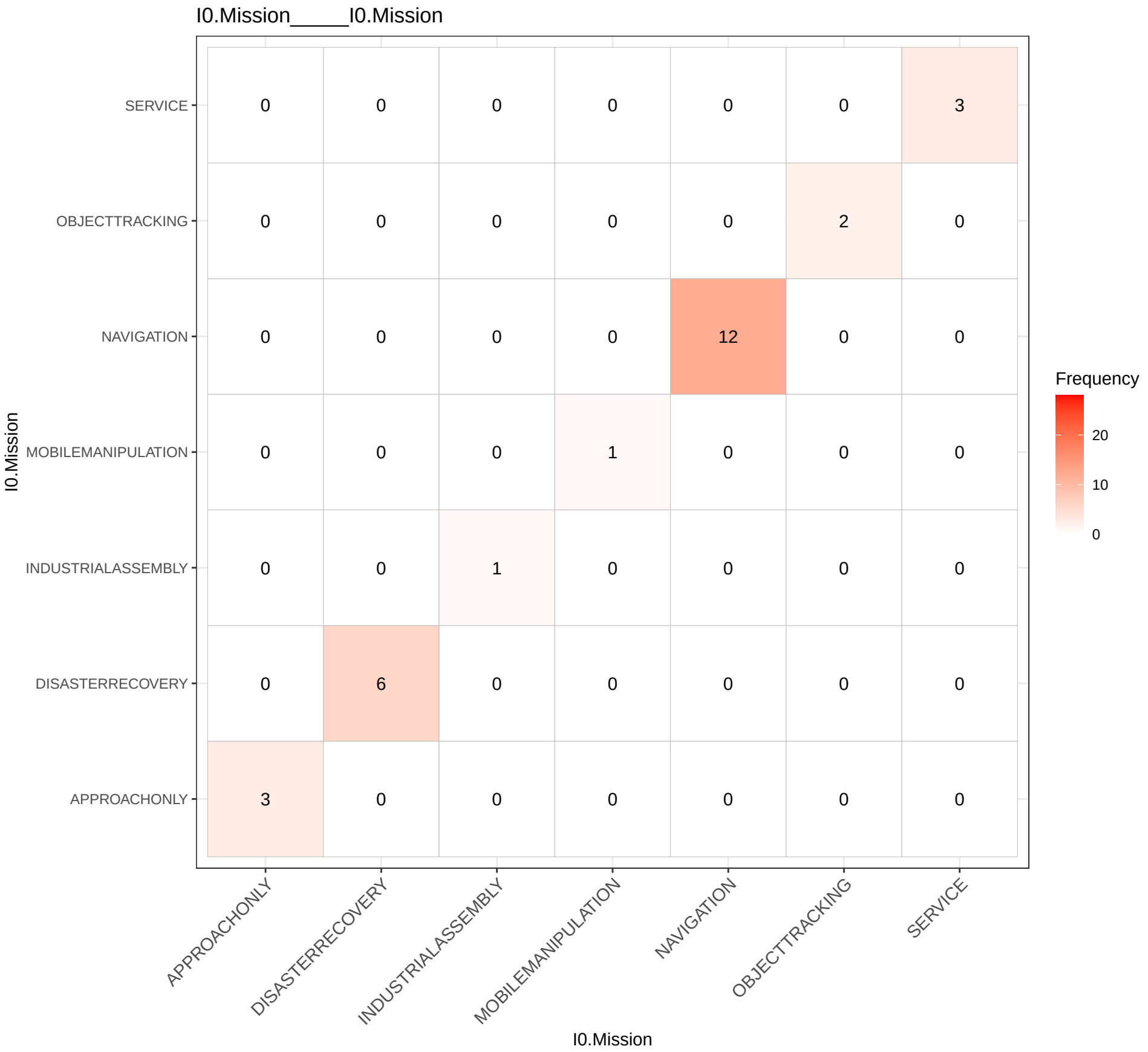
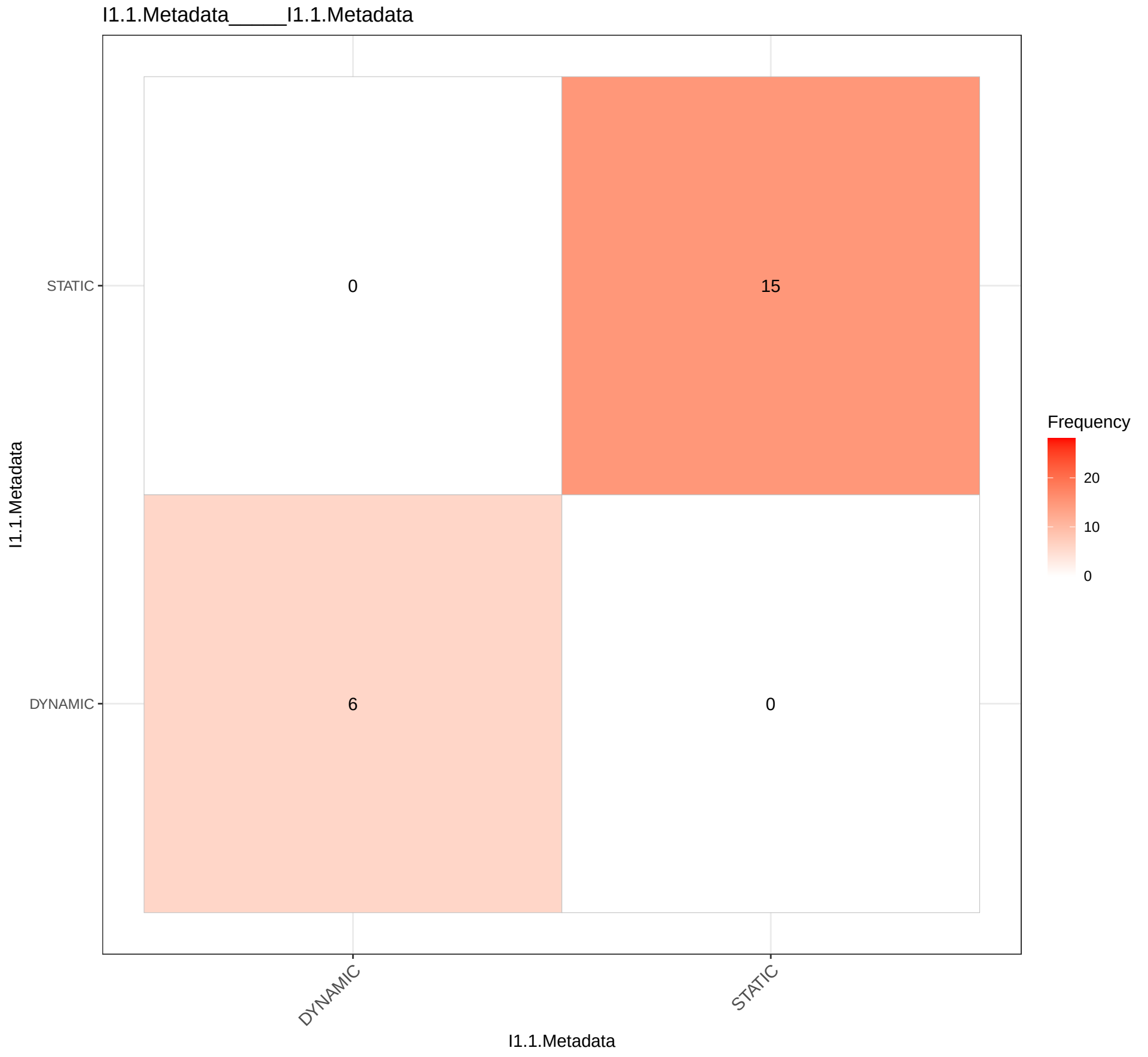
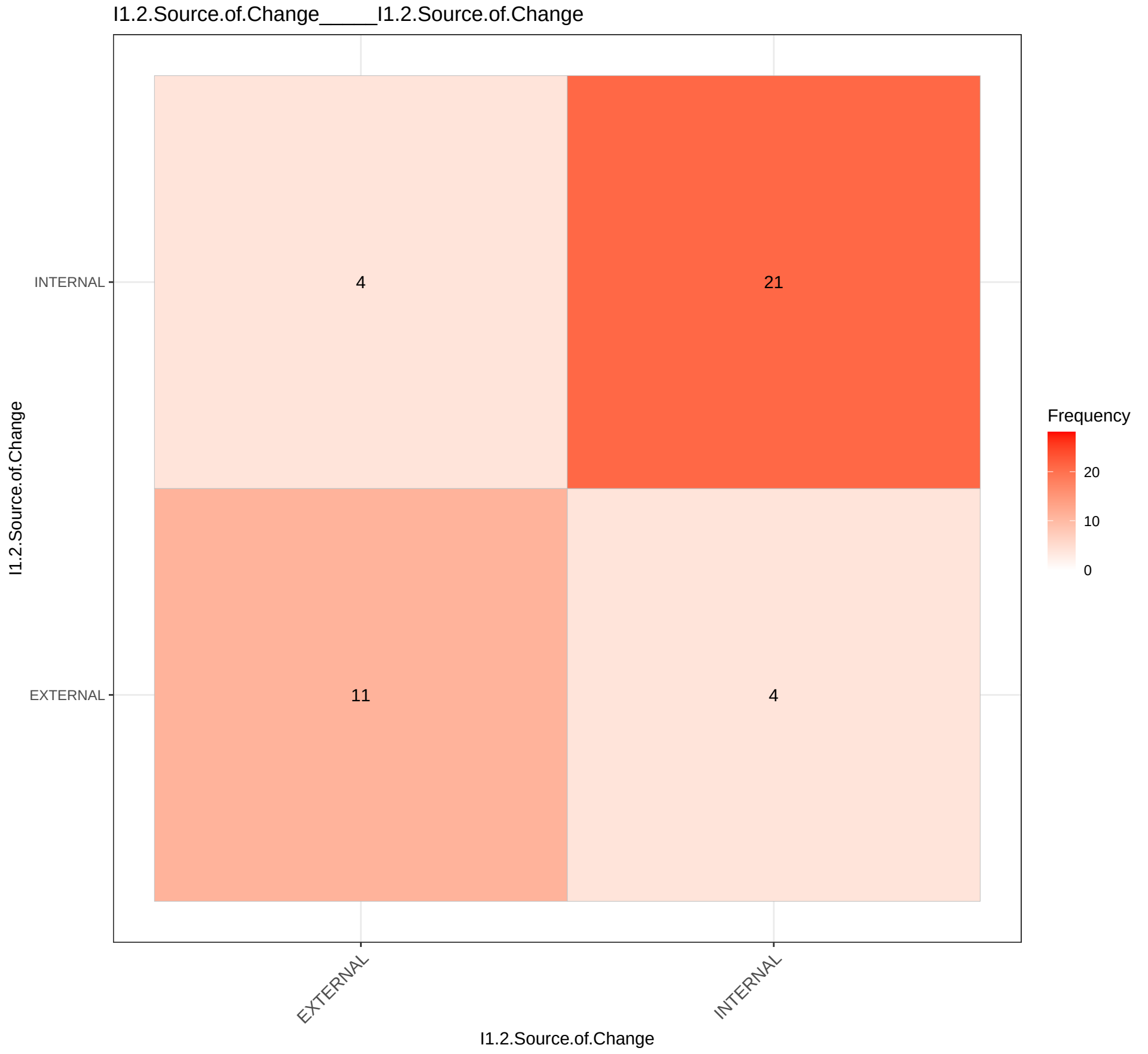
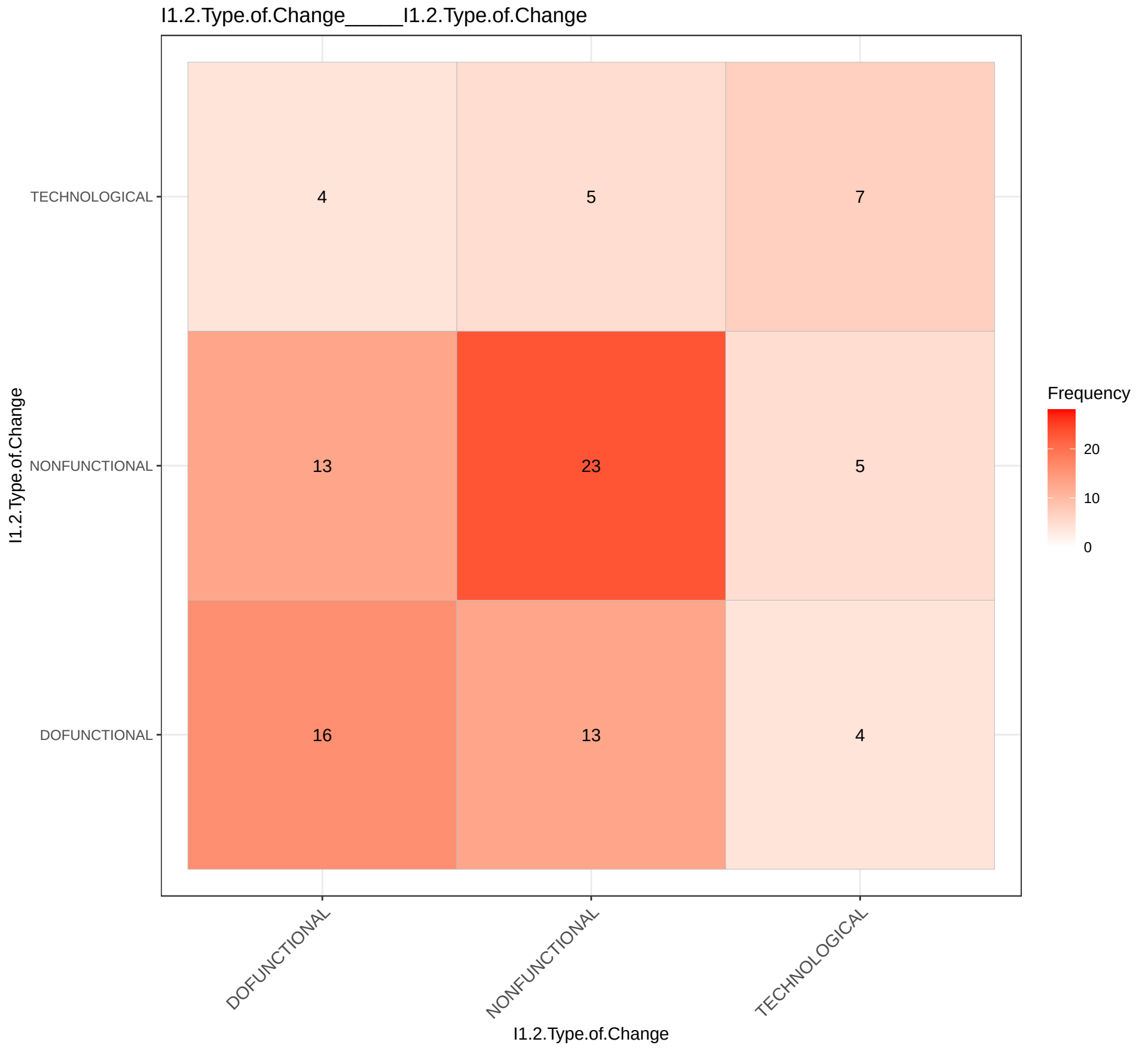
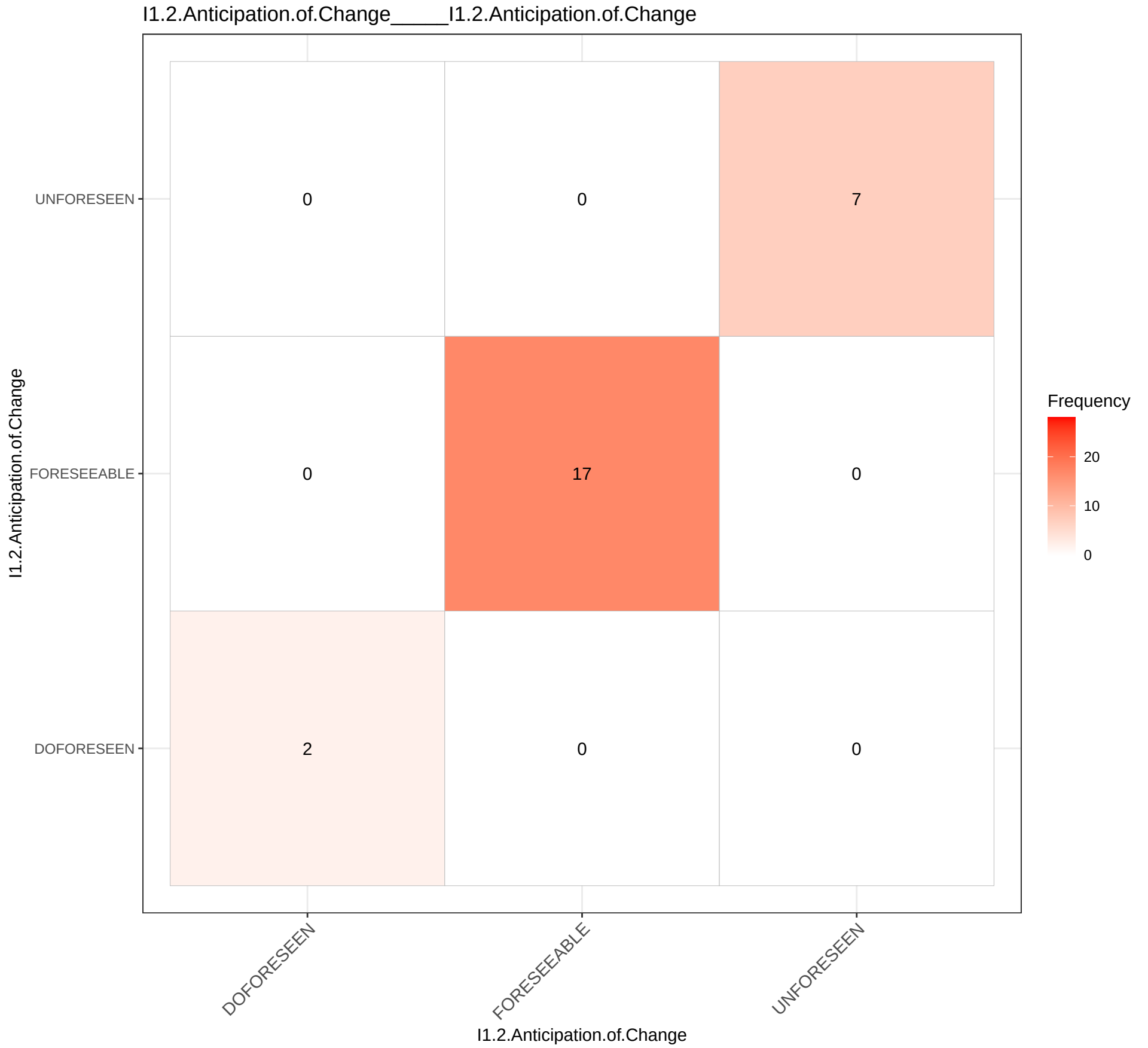
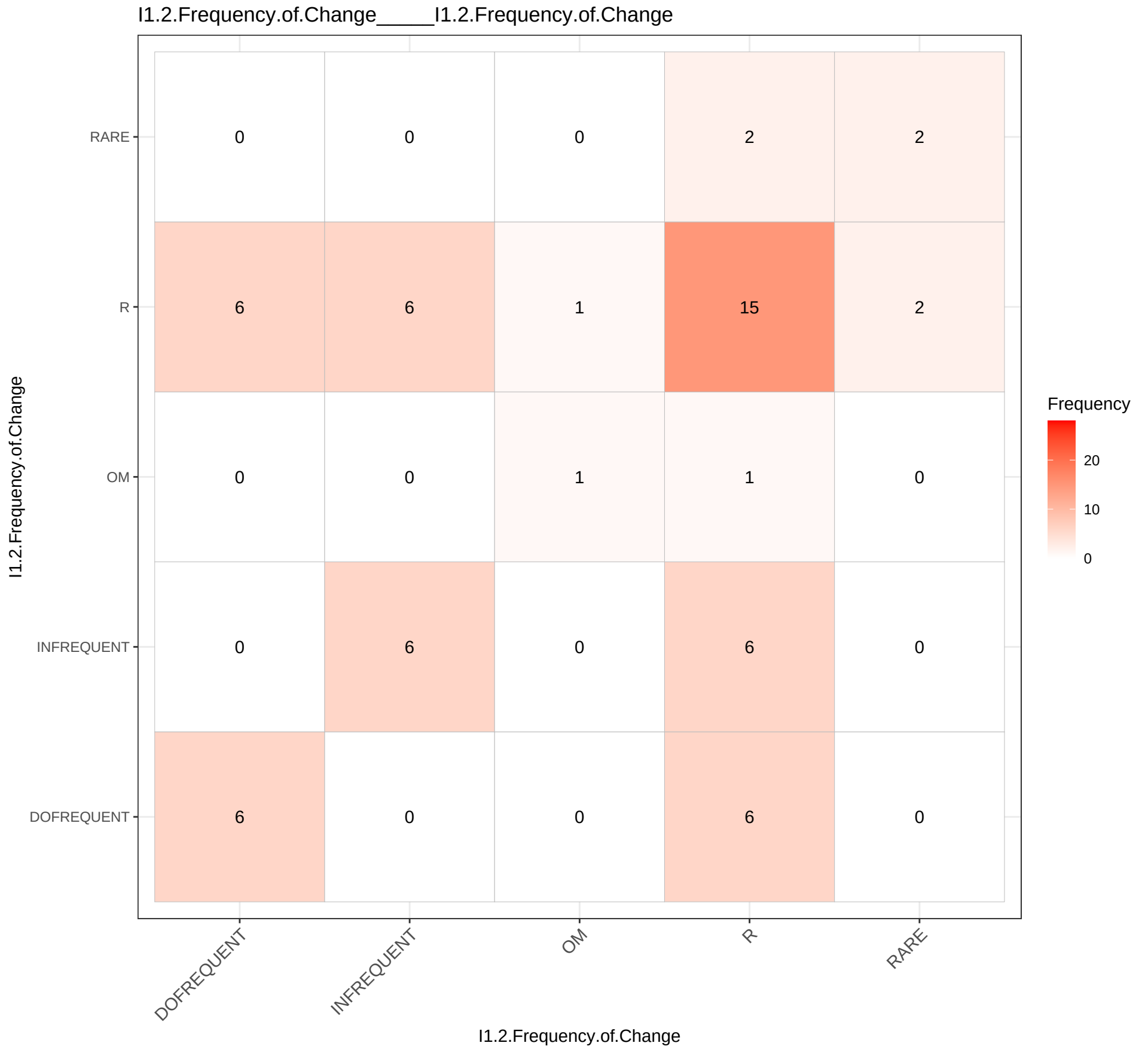

I0.Mission_____I0.Mission
SERVICE
OBJECTTRACKING
NAVIGATION
MOBILEMANIPULATION
INDUSTRIALASSEMBLY
DISASTERRECOVERY
APPROACHONLY
I0.Mission
APPROACHONLY
DISASTERRECOVERY
INDUSTRIALASSEMBLY
MOBILEMANIPULATION
NAVIGATION
OBJECTTRACKING
SERVICE
I0.Mission
Frequency
20
10
0

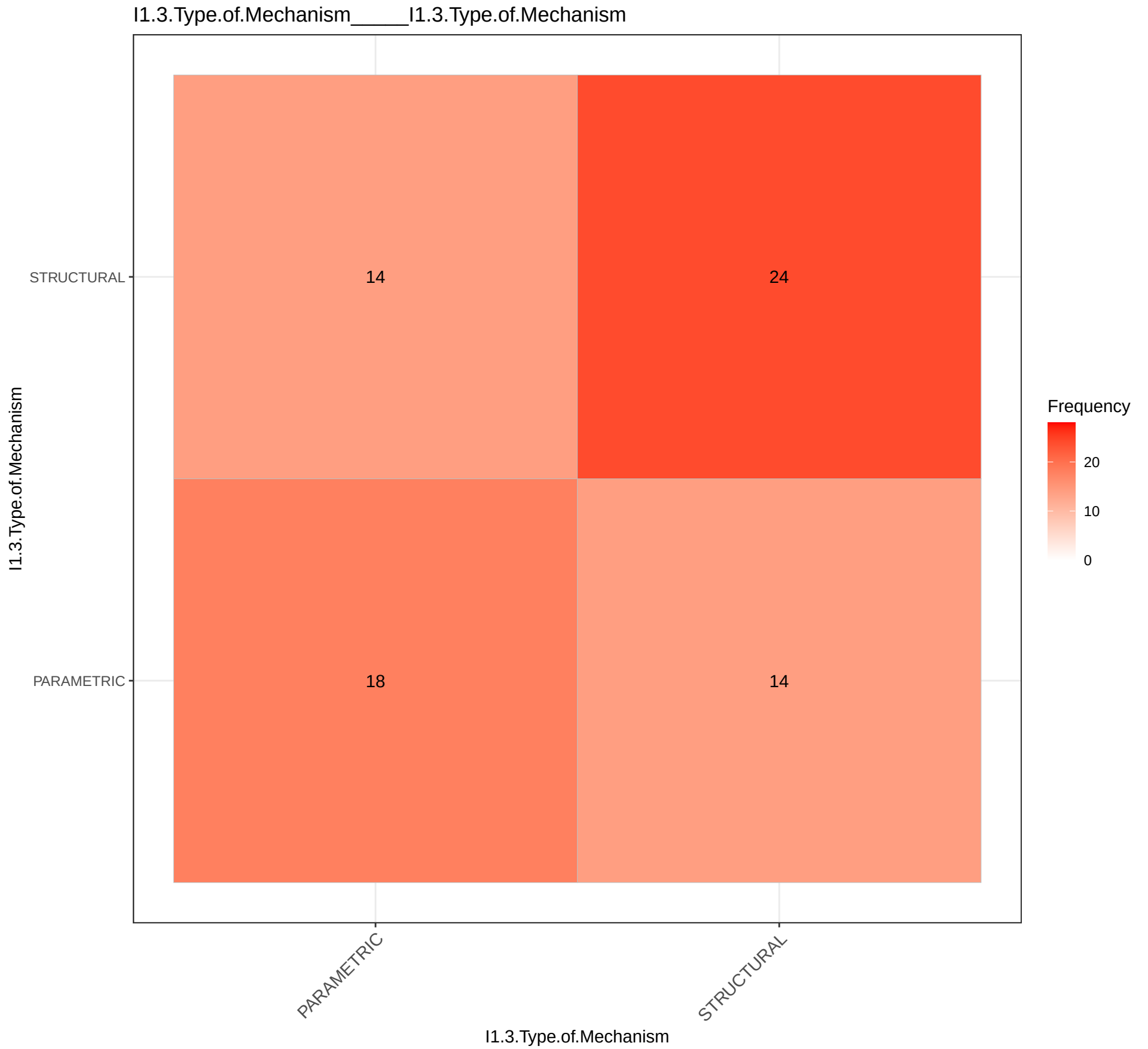

I1.1.Metadata_____I1.1.Metadata
STATIC
DYNAMIC
0
15
6
0
I1.1.Metadata
DYNAMIC
STATIC
I1.1.Metadata
Frequency
20
10
0

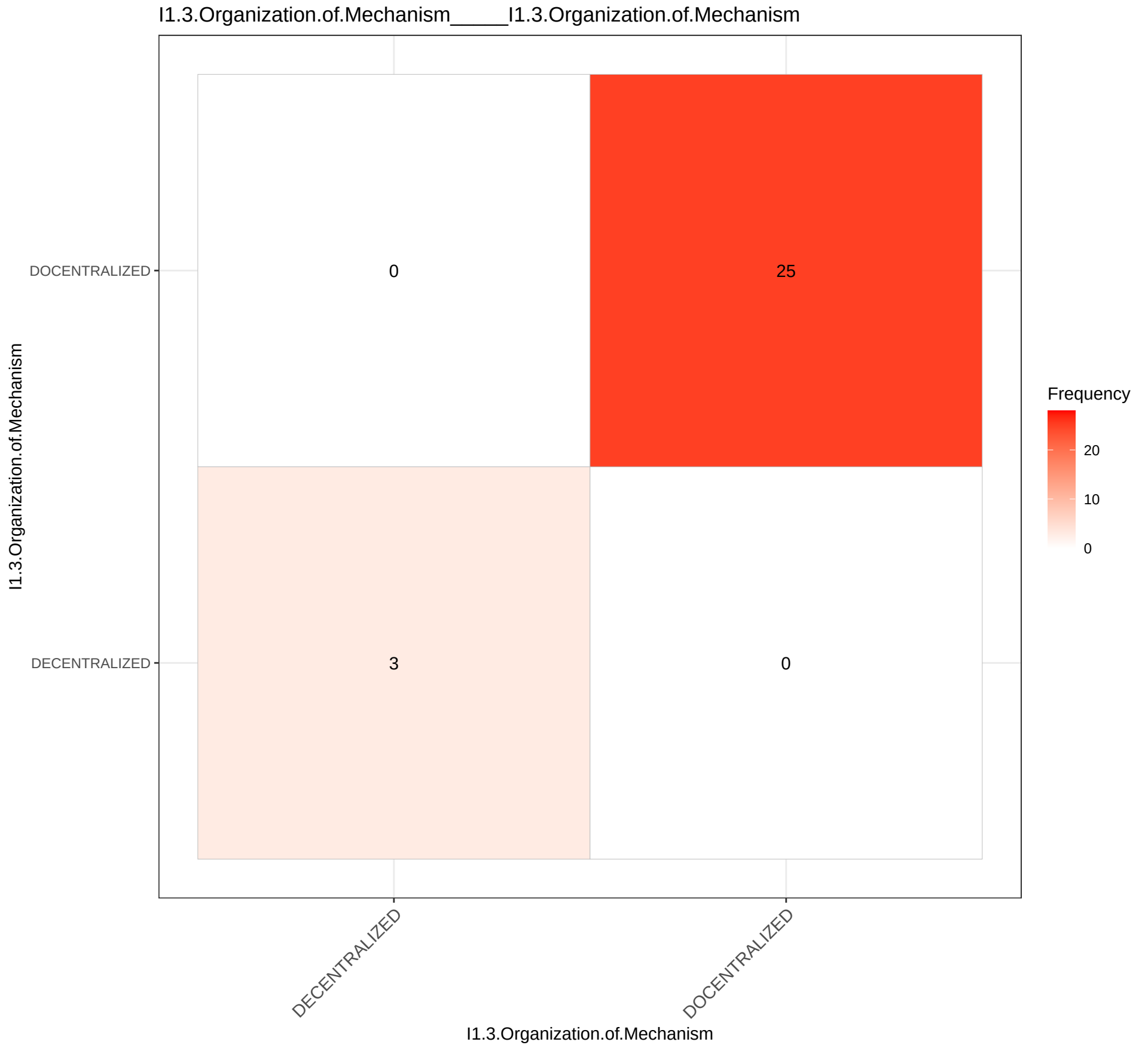

I1.2.Source.of.Change_____I1.2.Source.of.Change
INTERNAL
EXTERNAL
I1.2.Source.of.Change
4
21
11
4
EXTERNAL
INTERNAL
I1.2.Source.of.Change
Frequency
20
10
0


I1.2.Type.of.Change_____I1.2.Type.of.Change
TECHNOLOGICAL
NONFUNCTIONAL
DOFUNCTIONAL
I1.2.Type.of.Change
4
5
7
13
23
5
16
13
4
DOFUNCTIONAL
NONFUNCTIONAL
TECHNOLOGICAL
I1.2.Type.of.Change
Frequency
20
10
0


I1.2.Anticipation.of.Change_____I1.2.Anticipation.of.Change
UNFORESEEN
FORESEEABLE
DOFORESEEN
0
0
7
0
17
0
2
0
0
I1.2.Anticipation.of.Change
DOFORESEEN
FORESEEABLE
UNFORESEEN
I1.2.Anticipation.of.Change
Frequency
20
10
0


I1.2.Frequency.of.Change_____I1.2.Frequency.of.Change
RARE
R
OM
INFREQUENT
DOFREQUENT
0 0 0 2 2
6 6 1 15 2
0 0 1 1 0
0 6 0 6 0
6 0 0 6 0
I1.2.Frequency.of.Change
DOFREQUENT
INFREQUENT
OM
R
RARE
I1.2.Frequency.of.Change
Frequency
20
10
0


I1.3.Type.of.Mechanism_____I1.3.Type.of.Mechanism
STRUCTURAL
PARAMETRIC
14
24
18
14
I1.3.Type.of.Mechanism
PARAMETRIC
STRUCTURAL
I1.3.Type.of.Mechanism
Frequency
20
10
0


I1.3.Organization.of.Mechanism_____I1.3.Organization.of.Mechanism
DOCENTRALIZED
DECENTRALIZED
I1.3.Organization.of.Mechanism
0
25
3
0
DECENTRALIZED
DOCENTRALIZED
I1.3.Organization.of.Mechanism
Frequency
20
10
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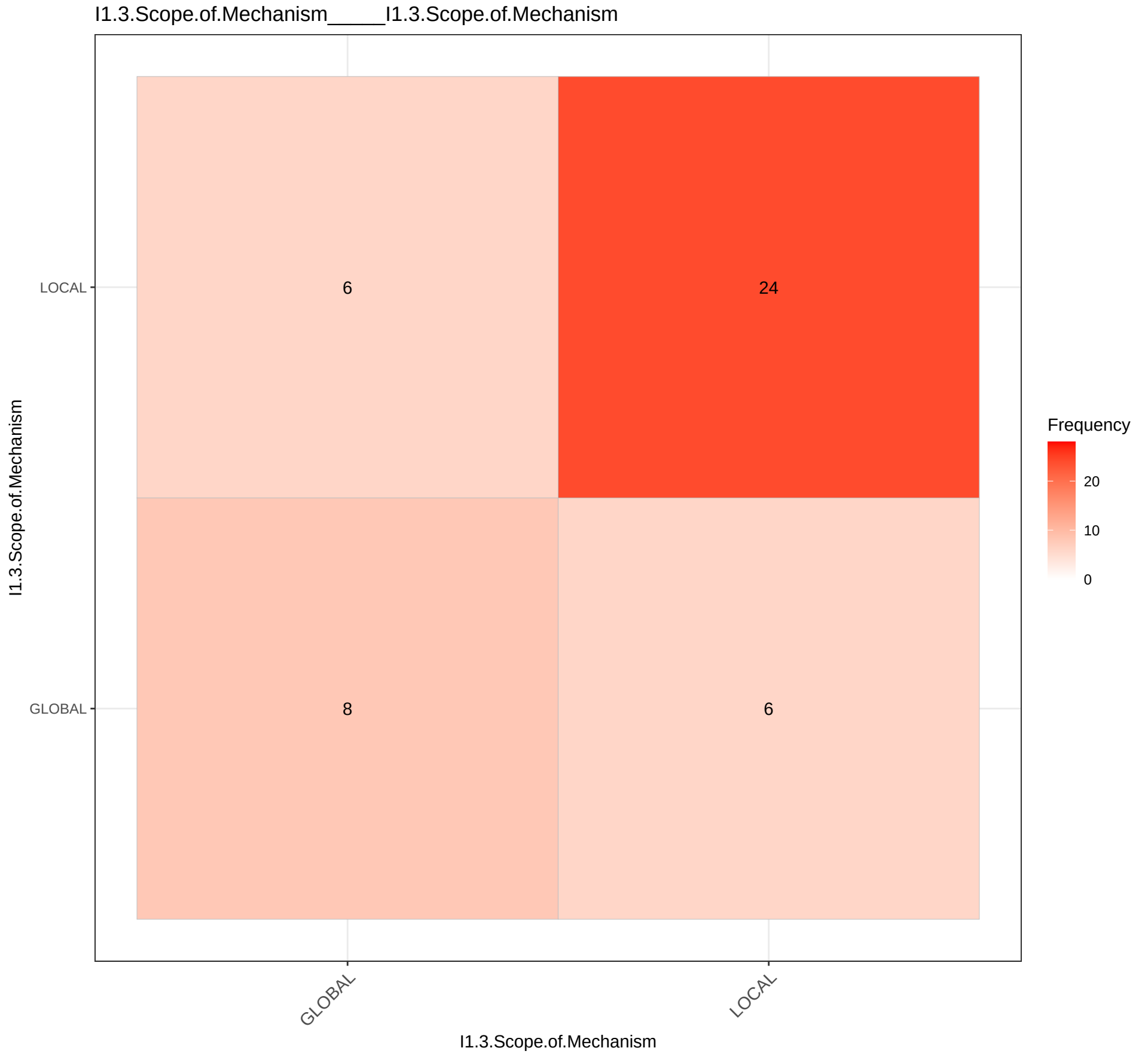
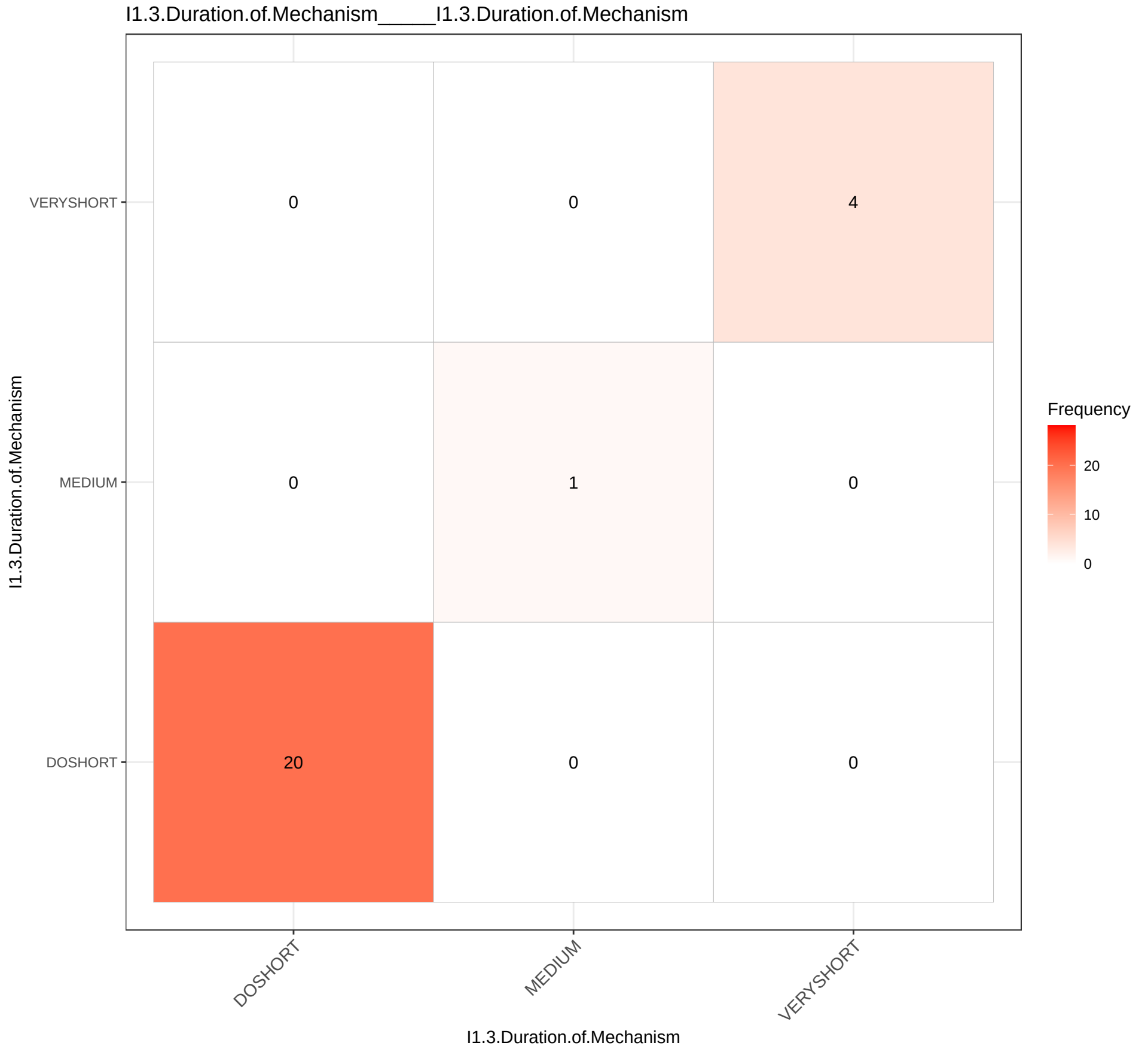
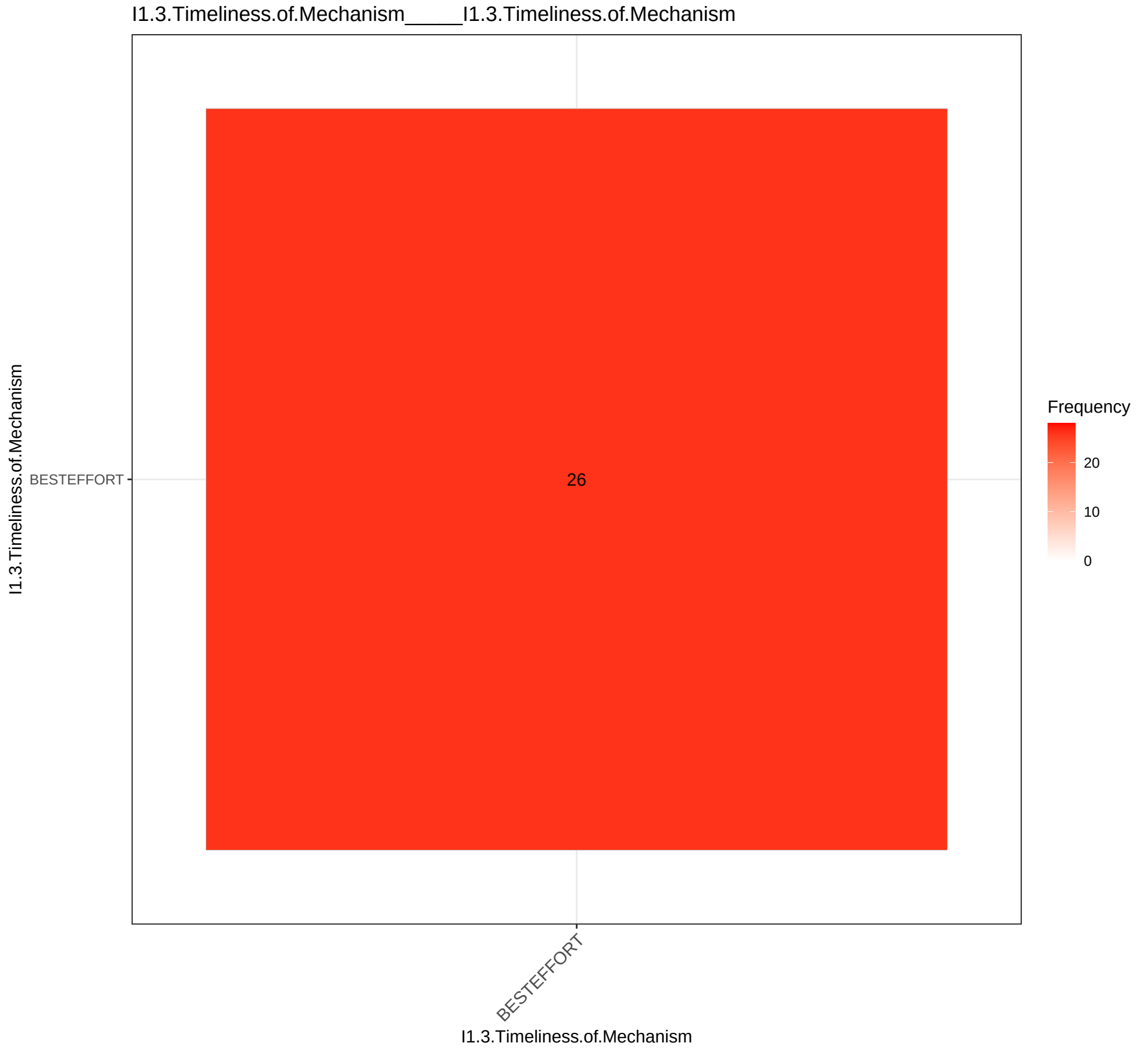
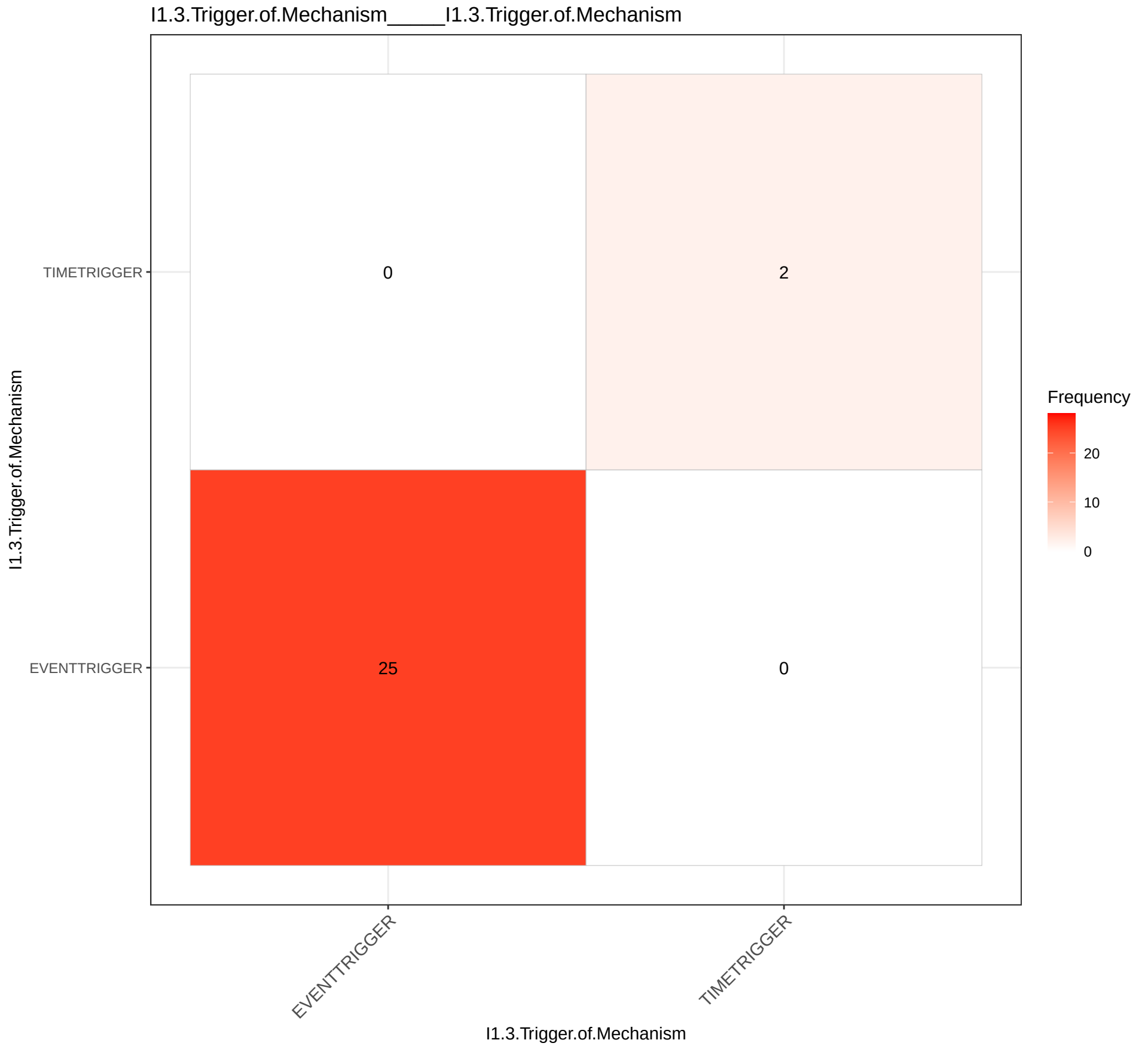
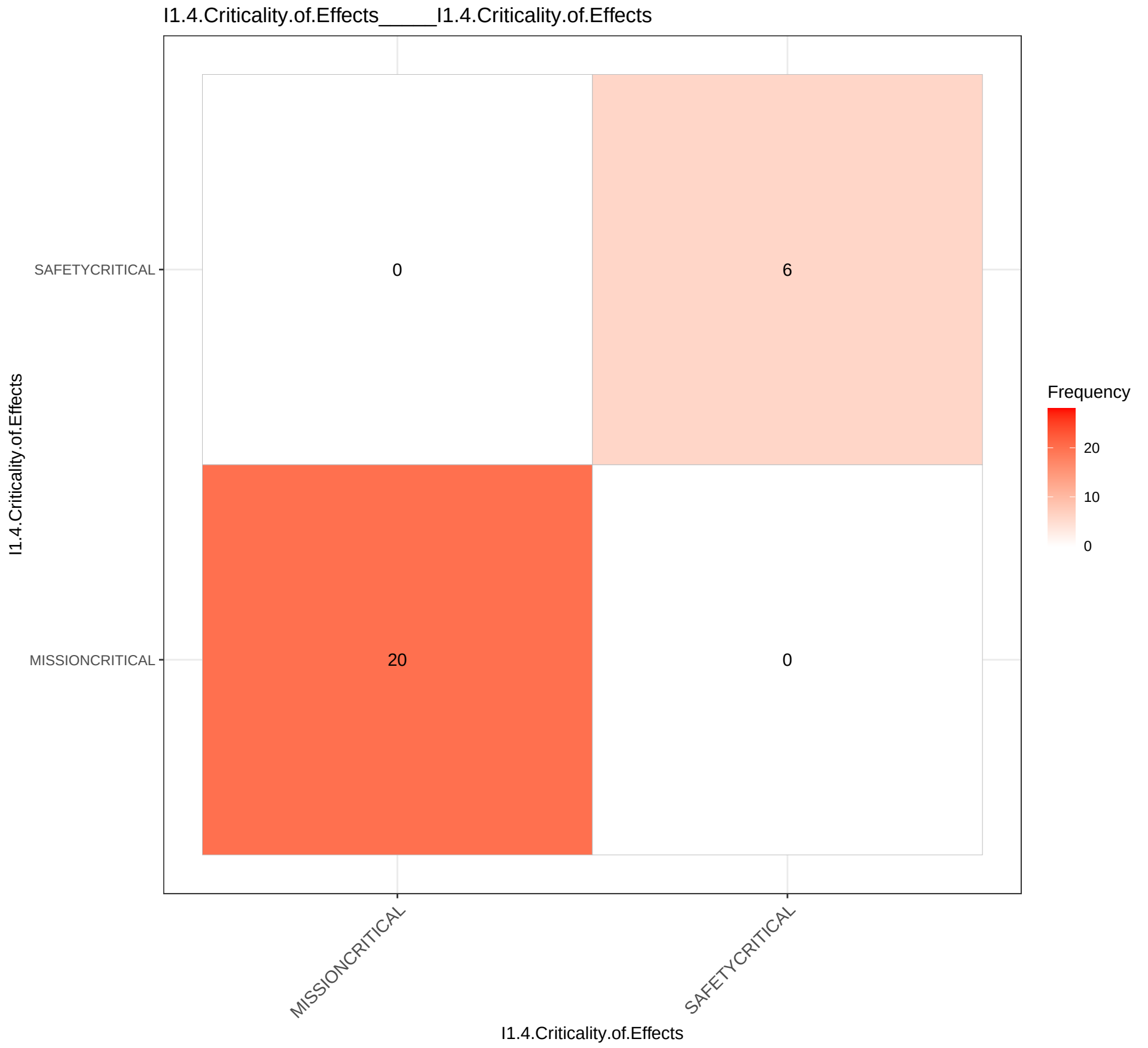
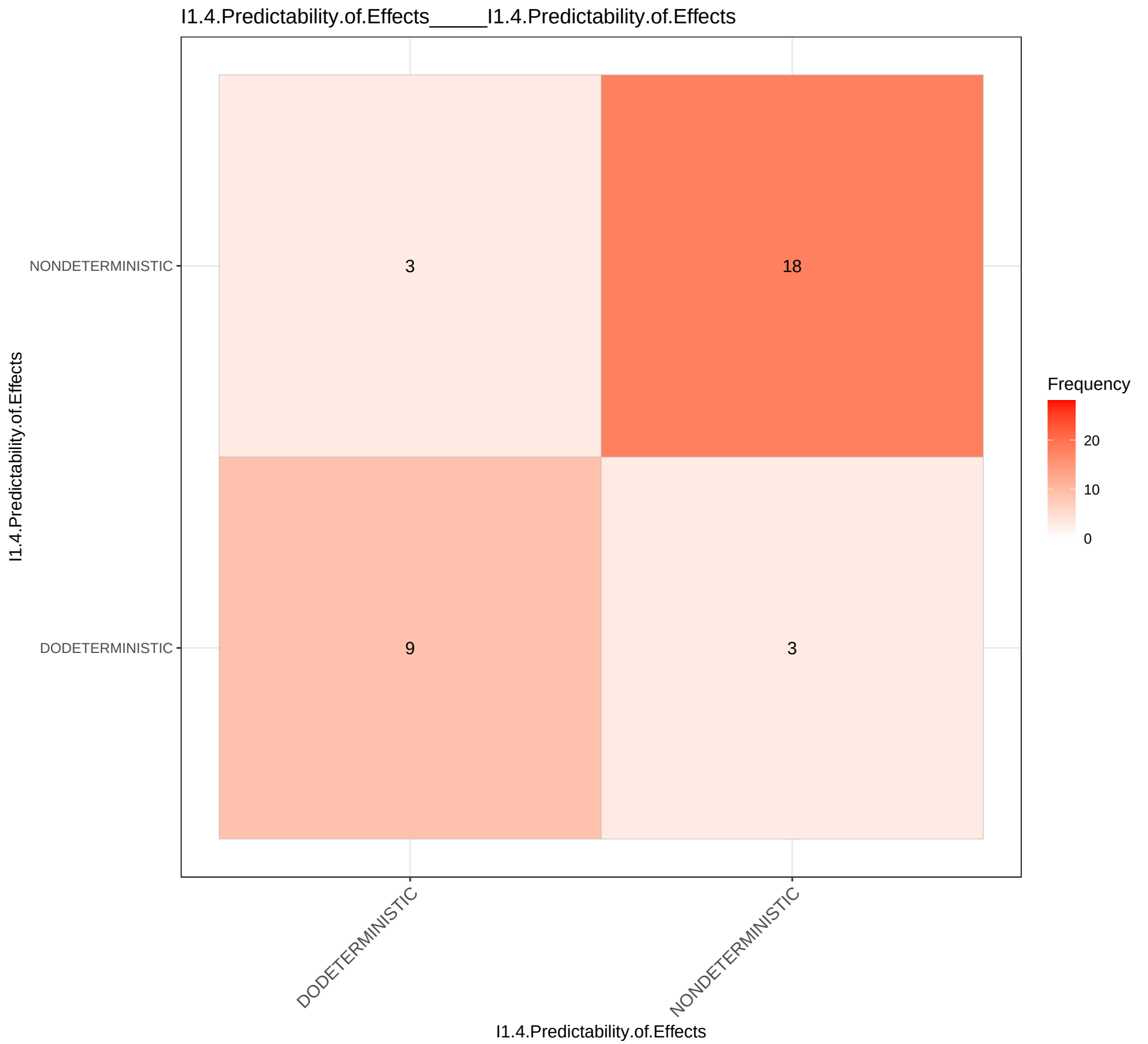

I1.3.Scope.of.Mechanism_____I1.3.Scope.of.Mechanism
LOCAL
GLOBAL
I1.3.Scope.of.Mechanism
6
24
8
6
GLOBAL
LOCAL
I1.3.Scope.of.Mechanism
Frequency
20
10
0

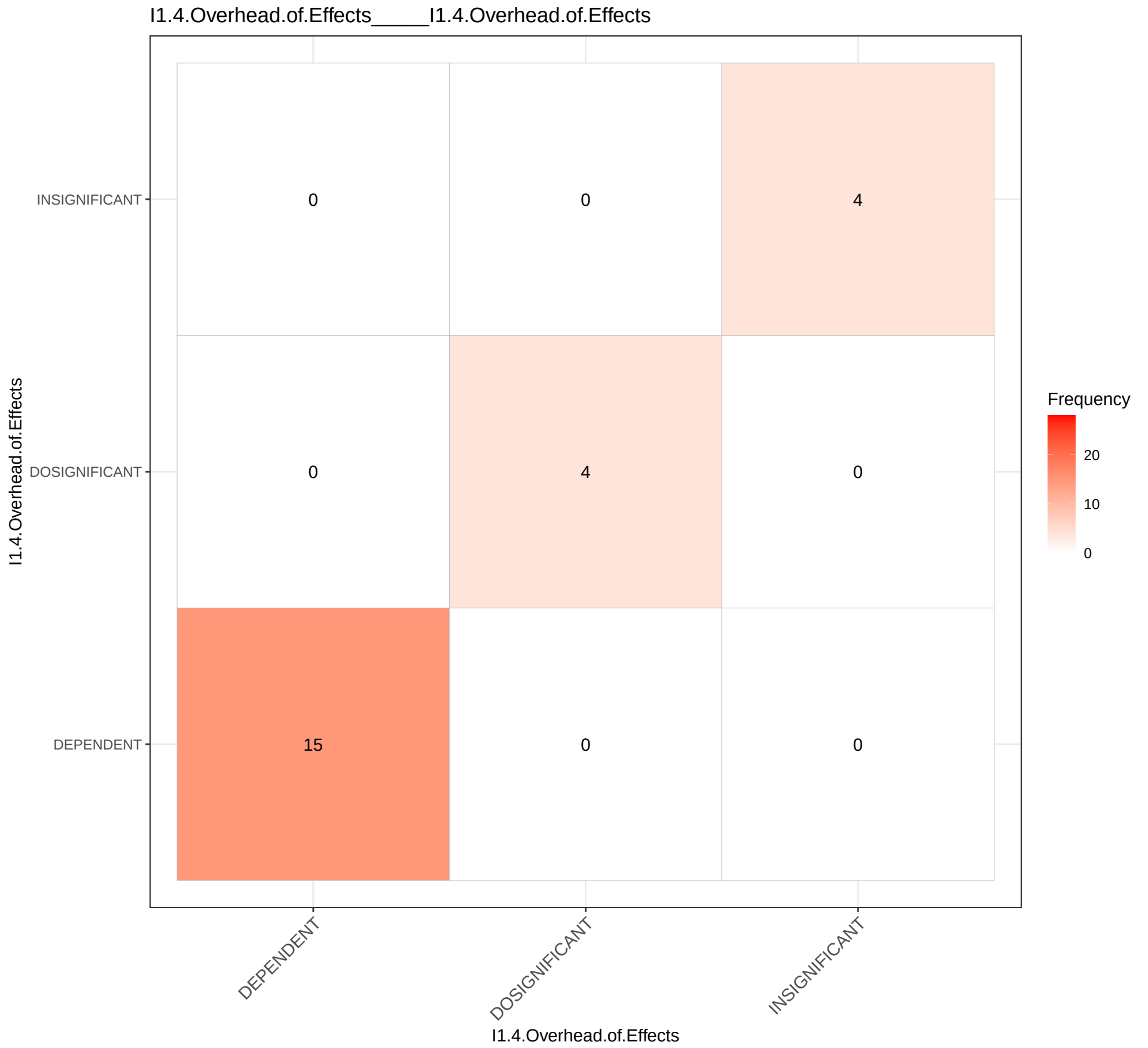

I1.3.Duration.of.Mechanism_____I1.3.Duration.of.Mechanism
VERYSHORT
MEDIUM
DOSHORT
0
0
4
0
1
0
20
0
0
I1.3.Duration.of.Mechanism
DOSHORT
MEDIUM
VERYSHORT
I1.3.Duration.of.Mechanism
Frequency
20
10
0

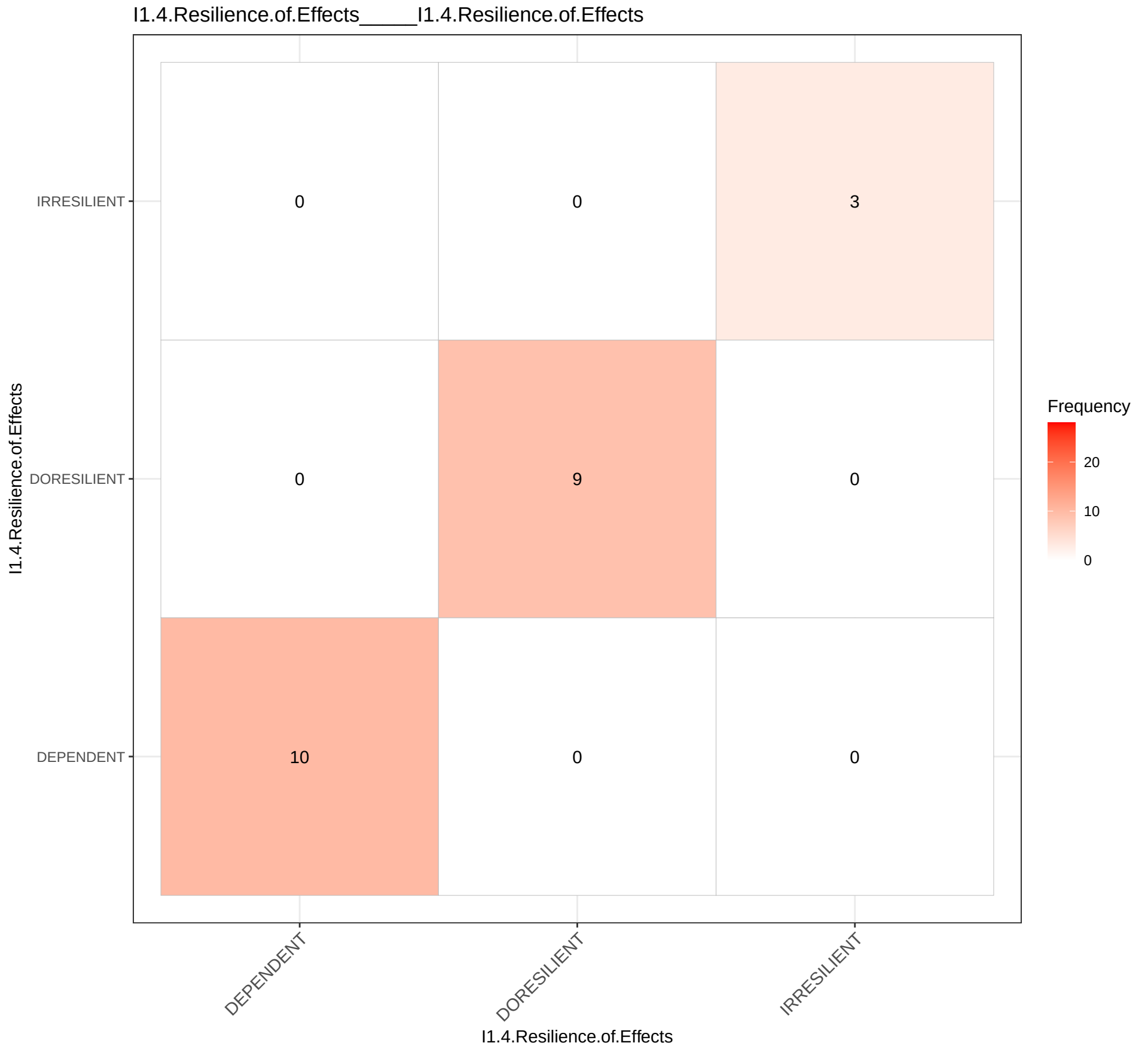

I1.3.Timeliness.of.Mechanism_____I1.3.Timeliness.of.Mechanism
I1.3.Timeliness.of.Mechanism
BESTEFFORT
26
BESTEFFORT
I1.3.Timeliness.of.Mechanism
Frequency
20
10
0

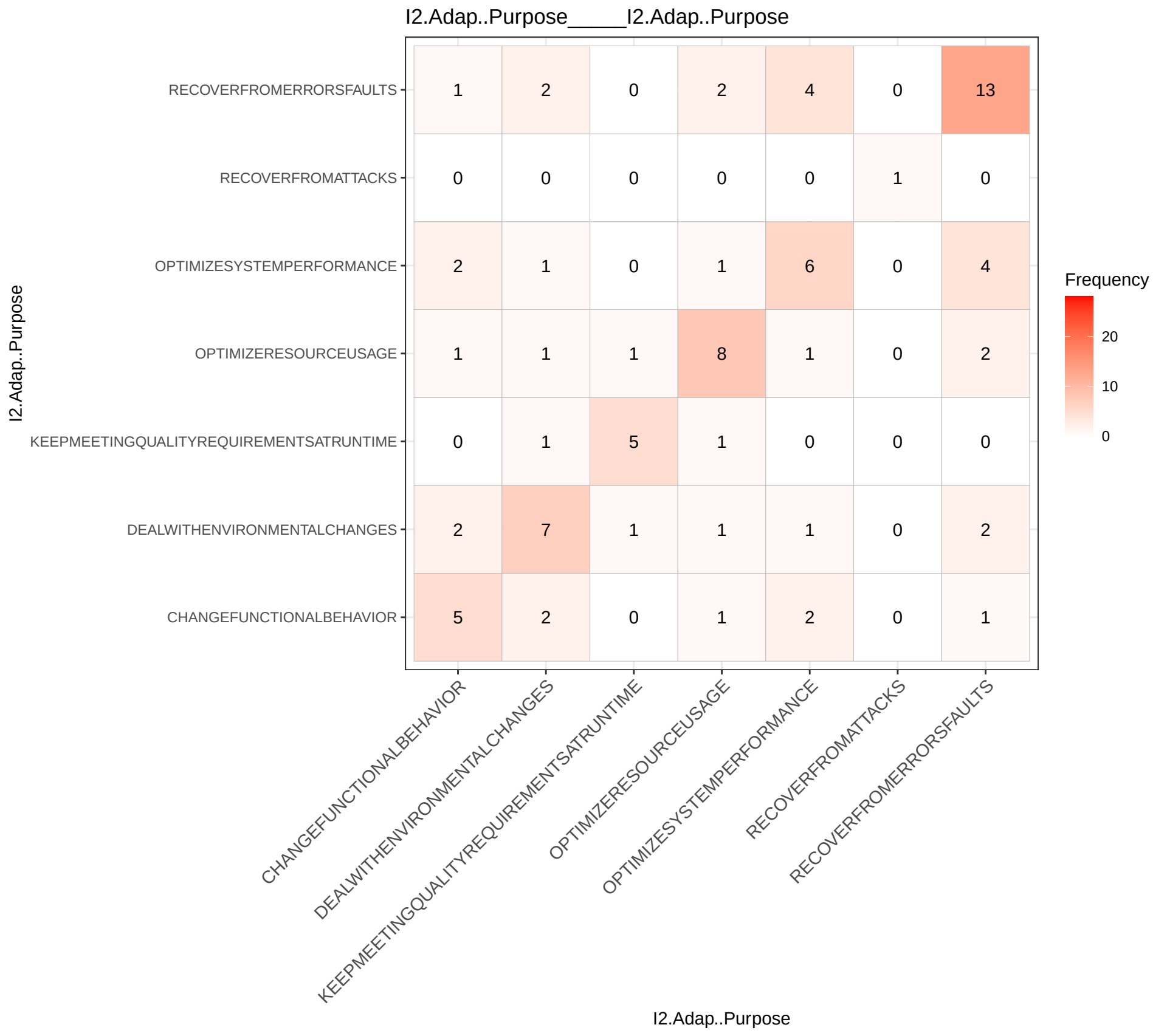

I1.3.Trigger.of.Mechanism_____I1.3.Trigger.of.Mechanism
TIMETRIGGER
EVENTTRIGGER
0
2
25
0
I1.3.Trigger.of.Mechanism
EVENTTRIGGER
TIMETRIGGER
I1.3.Trigger.of.Mechanism
Frequency
20
10
0

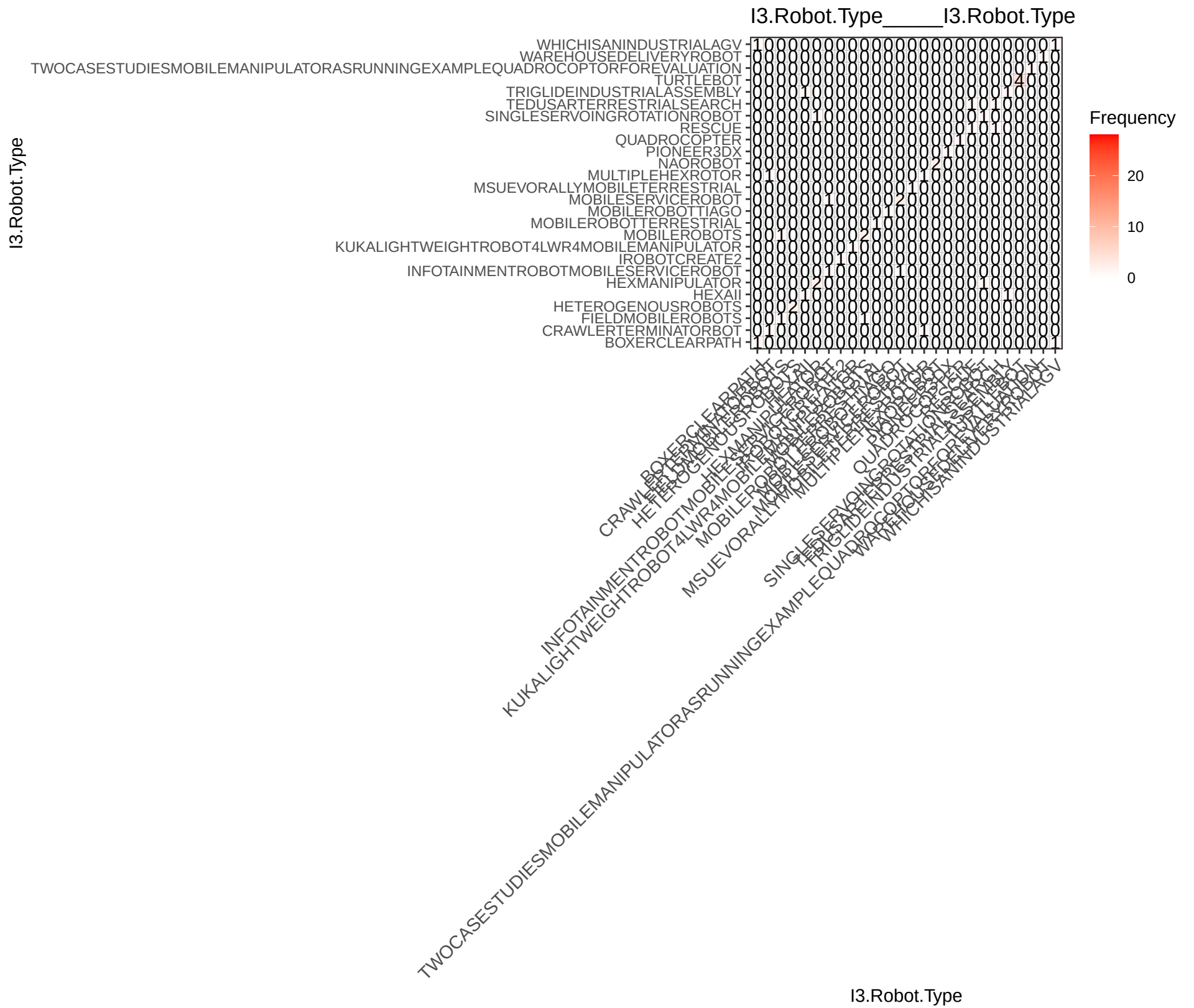

I1.4.Criticality.of.Effects_____I1.4.Criticality.of.Effects
SAFETYCRITICAL
MISSIONCRITICAL
0
6
20
0
I1.4.Criticality.of.Effects
MISSIONCRITICAL
SAFETYCRITICAL
I1.4.Criticality.of.Effects
Frequency
20
10
0

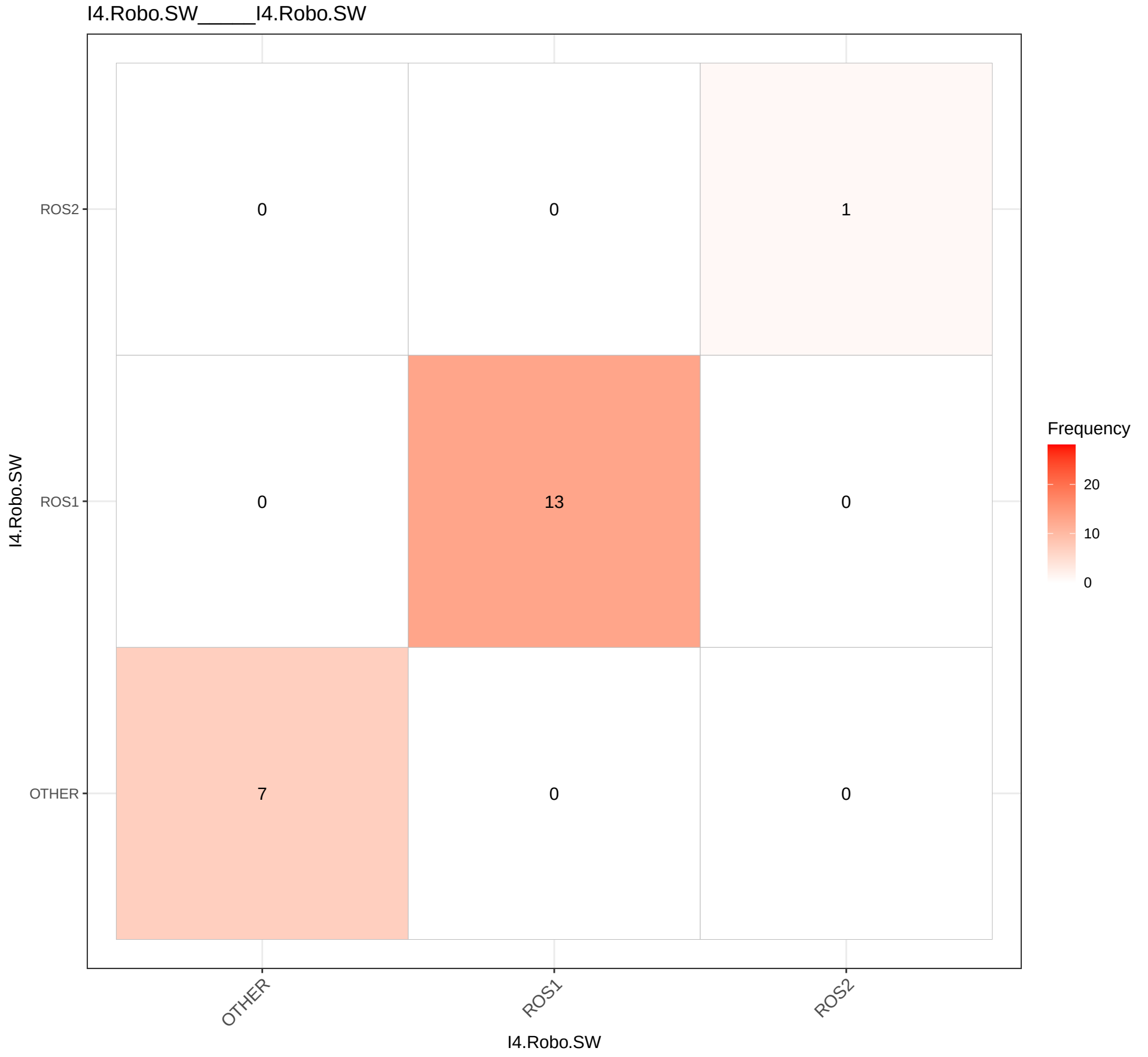

I1.4.Predictability.of.Effects_____I1.4.Predictability.of.Effects
NONDETERMINISTIC
DODETERMINISTIC
I1.4.Predictability.of.Effects
3
18
9
3
DODETERMINISTIC
NONDETERMINISTIC
I1.4.Predictability.of.Effects
Frequency
20
10
0

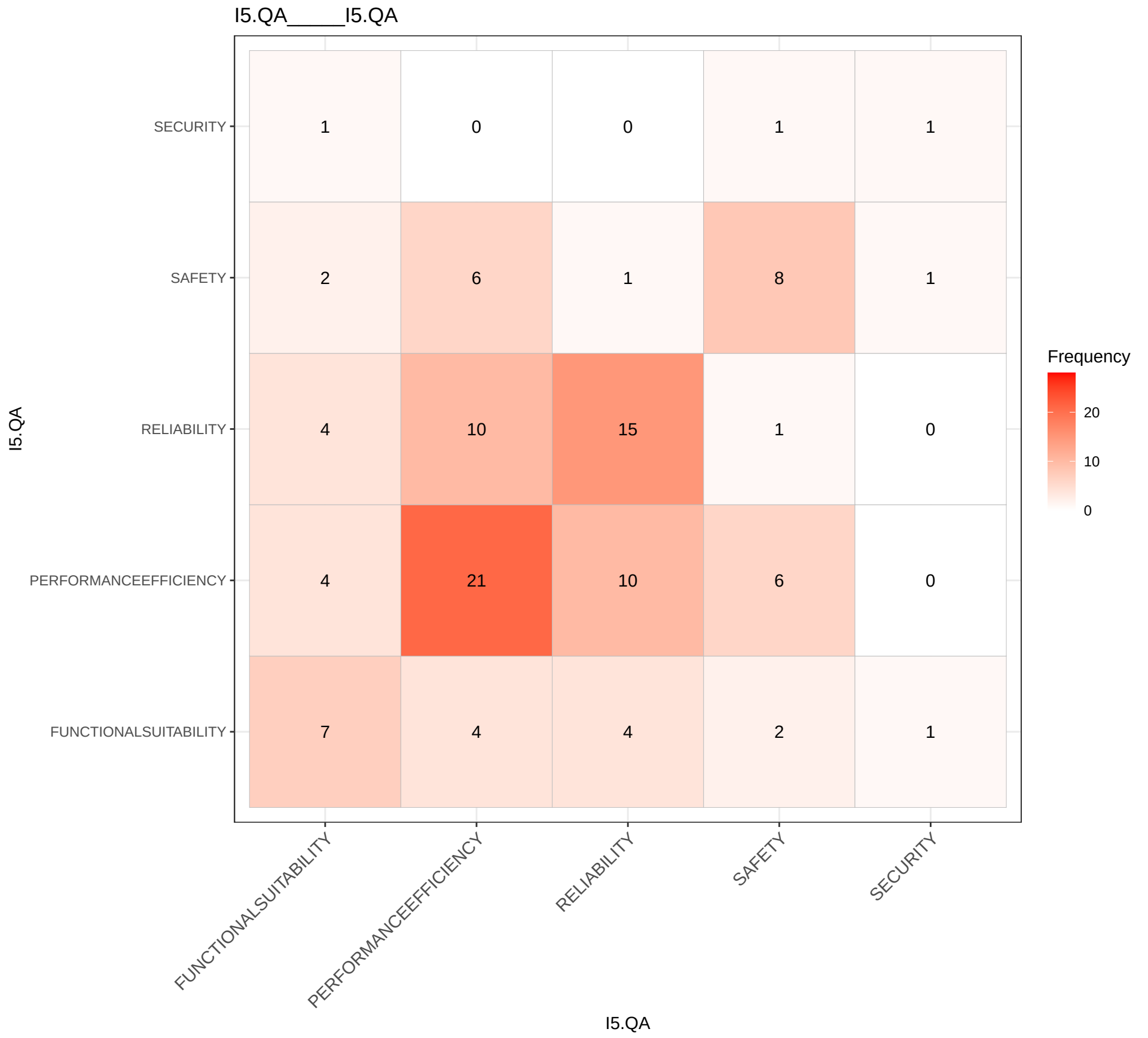

I1.4.Overhead.of.Effects_____I1.4.Overhead.of.Effects
INSIGNIFICANT
DOSIGNIFICANT
DEPENDENT
I1.4.Overhead.of.Effects
0
0
4
0
4
0
15
0
0
DEPENDENT
DOSIGNIFICANT
INSIGNIFICANT
I1.4.Overhead.of.Effects
Frequency
20
10
0

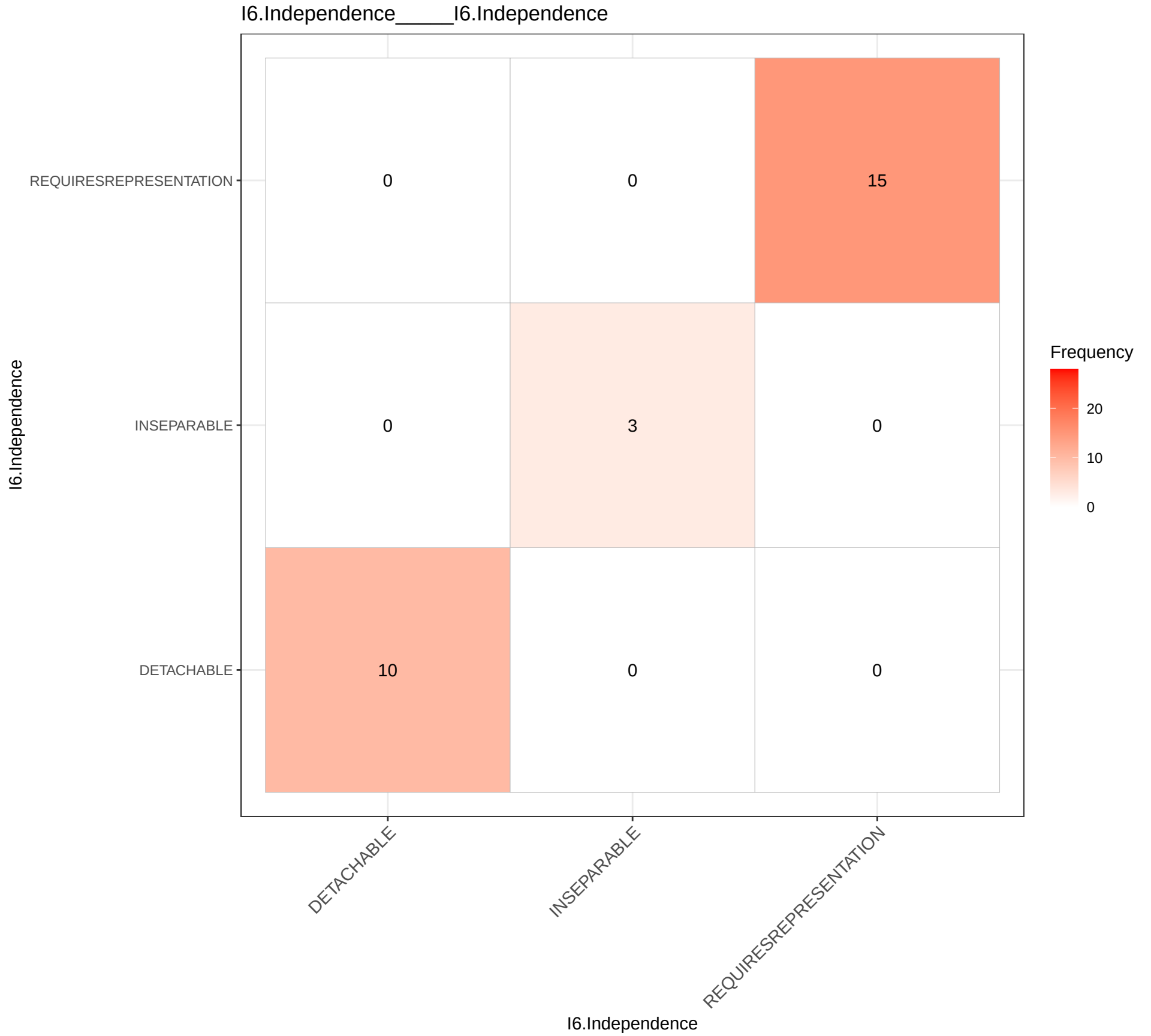

I1.4.Resilience.of.Effects_____I1.4.Resilience.of.Effects
IRRESILIENT
DORESILIENT
DEPENDENT
0
0
3
0
9
0
10
0
0
I1.4.Resilience.of.Effects
DEPENDENT
DORESILIENT
IRRESILIENT
I1.4.Resilience.of.Effects
Frequency
20
10
0

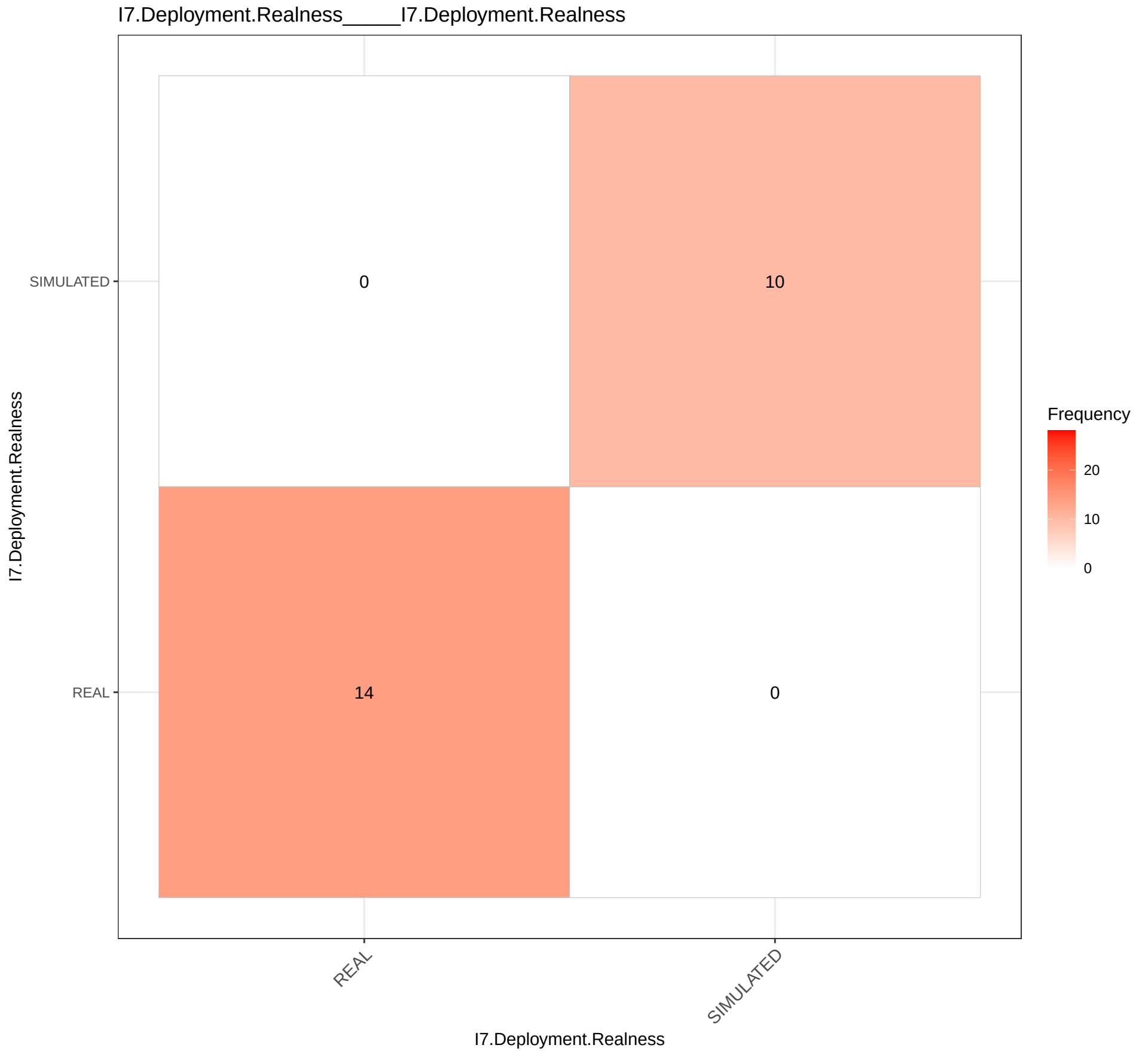

I2.Adap..Purpose_____I2.Adap..Purpose
RECOVERFROMERRORSFAULTS
RECOVERFROMATTACKS
OPTIMIZESYSTEMPERFORMANCE
OPTIMIZERESOURCEUSAGE
KEEPMEETINGQUALITYREQUIREMENTSATRUNTIME
DEALWITHENVIRONMENTALCHANGES
CHANGEFUNCTIONALBEHAVIOR
1 2 0 2 4 0 13
0 0 0 0 0 1 0
2 1 0 1 6 0 4
1 1 1 8 1 0 2
0 1 5 1 0 0 0
2 7 1 1 1 0 2
5 2 0 1 2 0 1
I2.Adap..Purpose
CHANGEFUNCTIONALBEHAVIOR
DEALWITHENVIRONMENTALCHANGES
KEEPMEETINGQUALITYREQUIREMENTSATRUNTIME
OPTIMIZERESOURCEUSAGE
OPTIMIZESYSTEMPERFORMANCE
RECOVERFROMATTACKS
RECOVERFROMERRORSFAULTS
I2.Adap..Purpose
Frequency
20
10
0

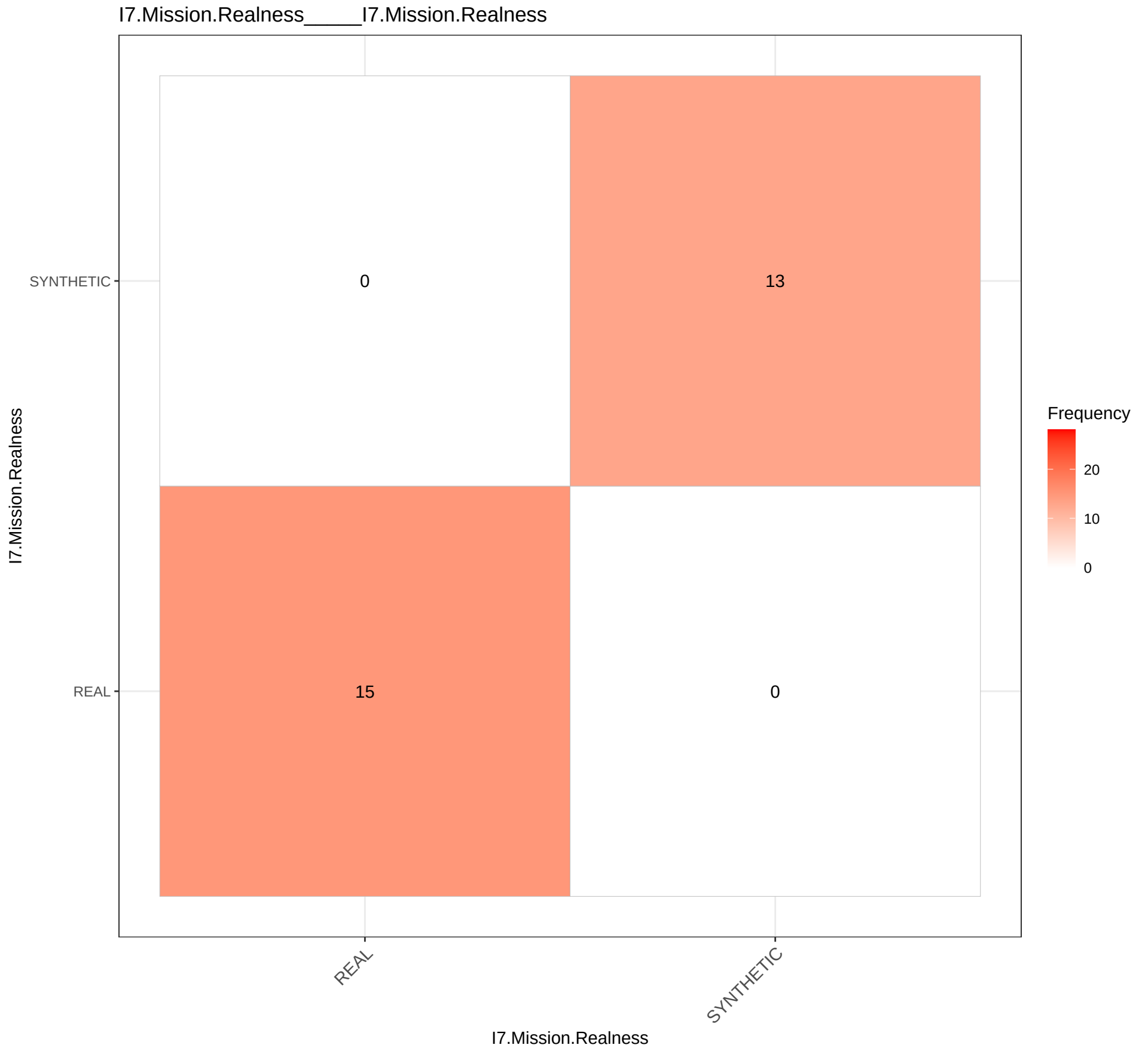

I3.Robot.Type_____I3.Robot.Type
I3.Robot.Type
WHICHISANINDUSTRIALAGV
WAREHOUSEDELIVERYROBOT
TWOCASESTUDIESMOBILEMANIPULATORASRUNNINGEXAMPLEQUADROCOPTORFOREVALUATION
TURTLEBOT
TRIGLIDEINDUSTRIALASSEMBLY
TEDUSARTERRESTRIALSEARCH
SINGLESERVOINGROTATIONROBOT
RESCUE
QUADROCOPTER
PIONEER3DX
NAOROBOT
MULTIPLEHEXROTOR
MSUEVORALLYMOBILETERRESTRIAL
MOBILESERVICEROBOT
MOBILEROBOTTIAGO
MOBILEROBOTTERRESTRIAL
MOBILEROBOTS
KUKALIGHTWEIGHTROBOT4LWR4MOBILEMANIPULATOR
IROBOTCREATE2
INFOTAINMENTROBOTMOBILESERVICEROBOT
HEXMANIPULATOR
HEXAII
HETEROGENOUSROBOTS
FIELDMOBILEROBOTS
CRAWLERTERMINATORBOT
BOXERCLEARPATH
Frequency
20
10
0
I3.Robot.Type

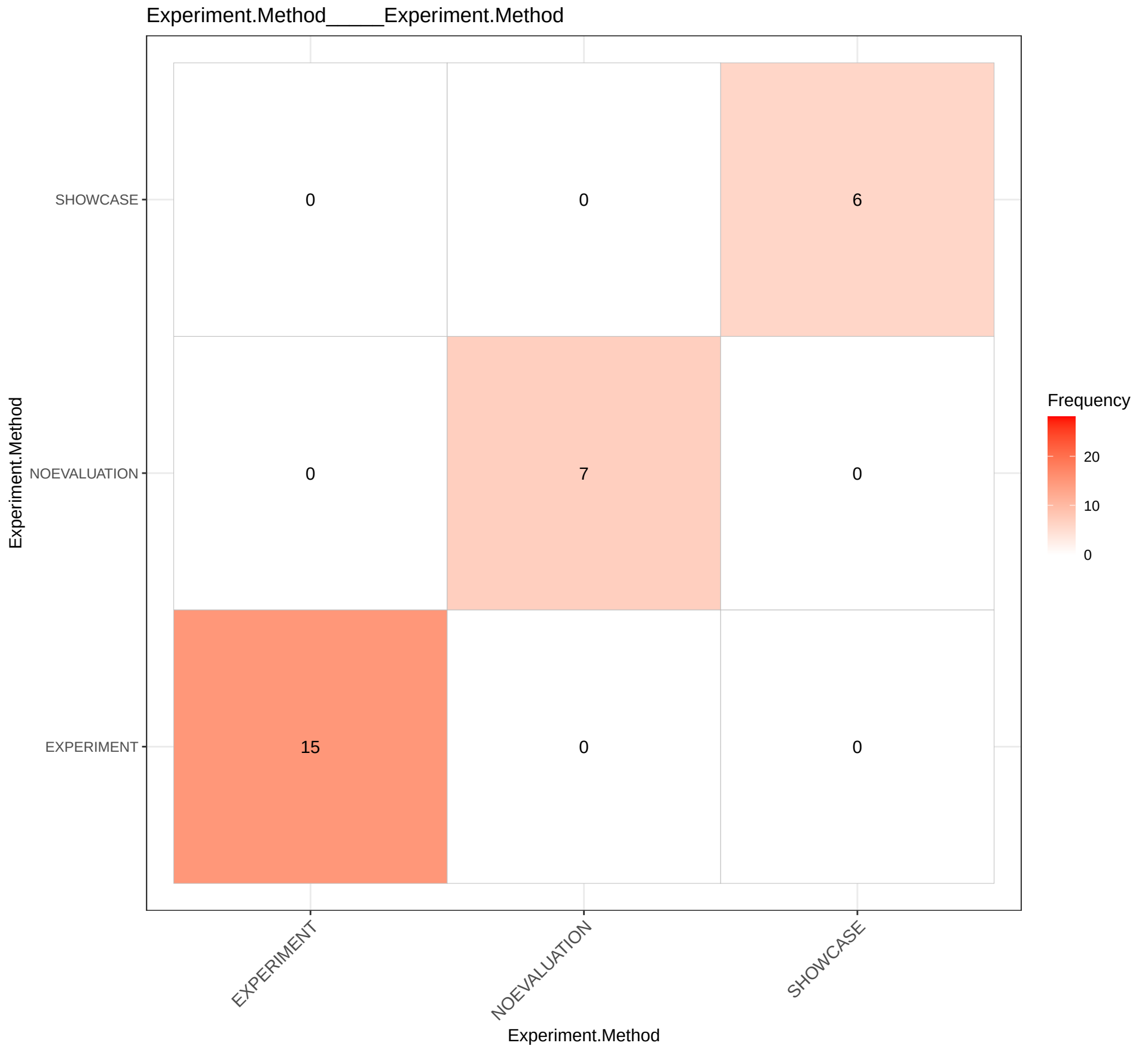

I4.Robo.SW_____I4.Robo.SW
ROS2
ROS1
OTHER
0
0
1
0
13
0
7
0
0
I4.Robo.SW
OTHER
ROS1
ROS2
I4.Robo.SW
Frequency
20
10
0

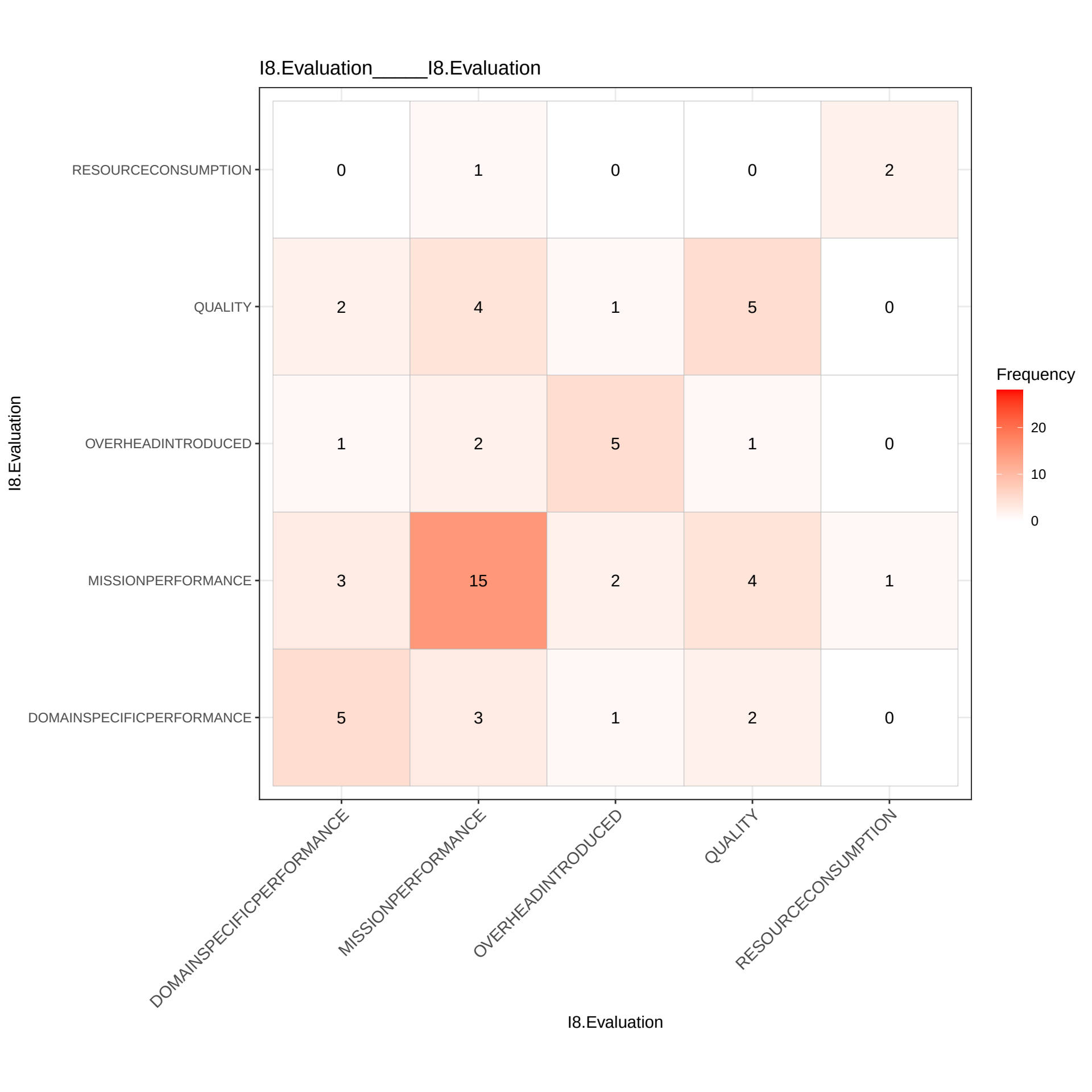

I5.QA_____I5.QA
SECURITY
SAFETY
RELIABILITY
PERFORMANCEEFFICIENCY
FUNCTIONALSUITABILITY
1 0 0 1 1
2 6 1 8 1
4 10 15 1 0
4 21 10 6 0
7 4 4 2 1
FUNCTIONALSUITABILITY
PERFORMANCEEFFICIENCY
RELIABILITY
SAFETY
SECURITY
I5.QA
I5.QA
Frequency
20
10
0


I6.Independence_____I6.Independence
REQUIRESREPRESENTATION
INSEPARABLE
DETACHABLE
0
0
15
0
3
0
10
0
0
I6.Independence
DETACHABLE
INSEPARABLE
REQUIRESREPRESENTATION
I6.Independence
Frequency
20
10
0


I7.Deployment.Realness_____I7.Deployment.Realness
SIMULATED
REAL
I7.Deployment.Realness
0
10
14
0
REAL
SIMULATED
I7.Deployment.Realness
Frequency
20
10
0


I7.Mission.Realness_____I7.Mission.Realness
SYNTHETIC
REAL
0
13
15
0
I7.Mission.Realness
REAL
SYNTHETIC
I7.Mission.Realness
Frequency
20
10
0


Experiment.Method_____Experiment.Method
SHOWCASE
NOEVALUATION
EXPERIMENT
0
0
6
0
7
0
15
0
0
Experiment.Method
EXPERIMENT
NOEVALUATION
SHOWCASE
Experiment.Method
Frequency
20
10
0


I8.Evaluation_____I8.Evaluation
RESOURCECONSUMPTION
QUALITY
OVERHEADINTRODUCED
MISSIONPERFORMANCE
DOMAINSPECIFICPERFORMANCE
0 1 0 0 2
2 4 1 5 0
1 2 5 1 0
3 15 2 4 1
5 3 1 2 0
I8.Evaluation
DOMAINSPECIFICPERFORMANCE
MISSIONPERFORMANCE
OVERHEADINTRODUCED
QUALITY
RESOURCECONSUMPTION
I8.Evaluation
Frequency
20
10
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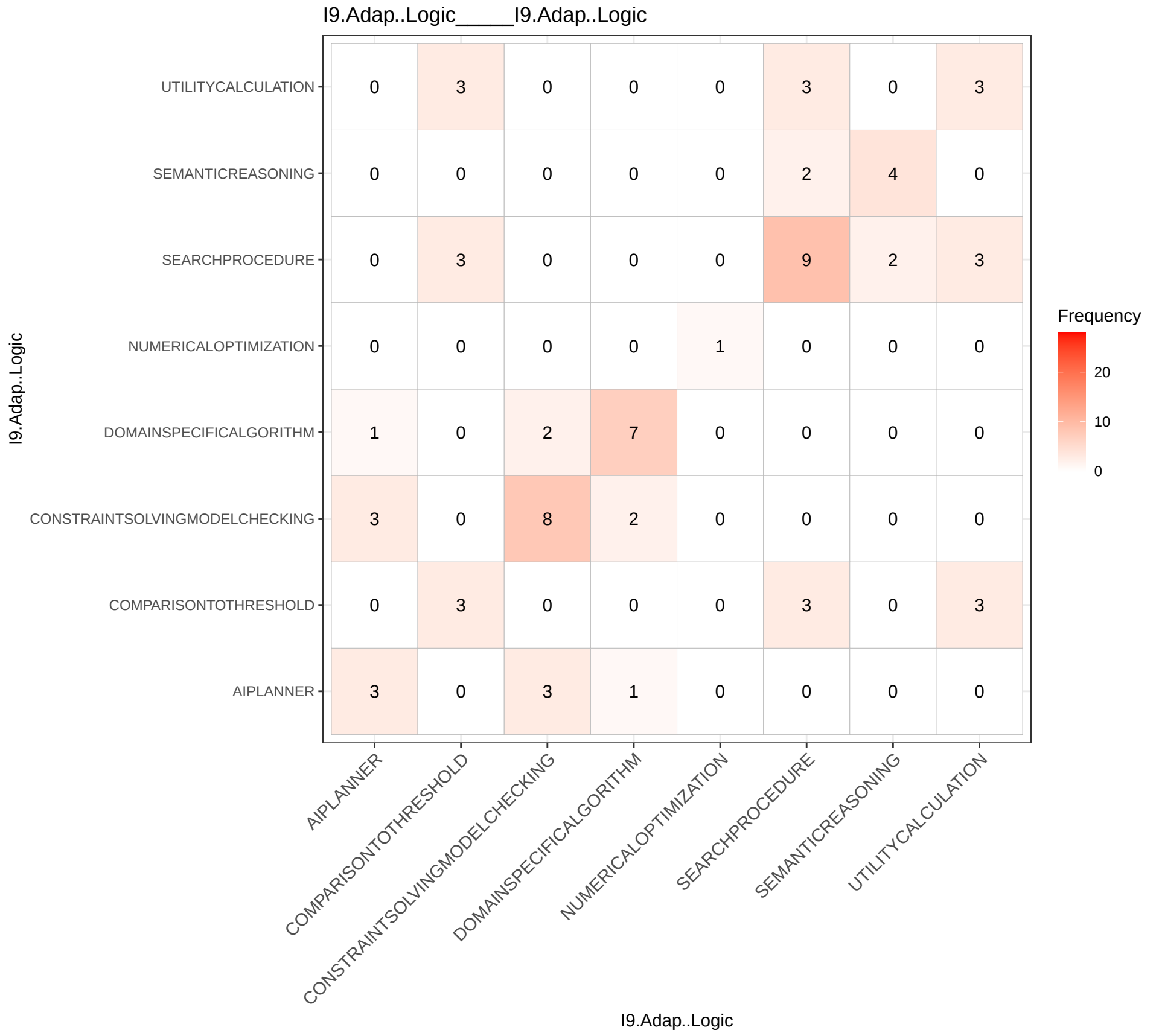
I9.Adap..Logic_____I9.Adap..Logic
UTILITYCALCULATION
SEMANTICREASONING
SEARCHPROCEDURE
NUMERICALOPTIMIZATION
DOMAINSPECIFICALGORITHM
CONSTRAINTSOLVINGMODELCHECKING
COMPARISONTOTHRESHOLD
AIPLANNER
0 3 0 0 0 3 0 3
0 0 0 0 0 2 4 0
0 3 0 0 0 9 2 3
0 0 0 0 1 0 0 0
1 0 2 7 0 0 0 0
3 0 8 2 0 0 0 0
0 3 0 0 0 3 0 3
3 0 3 1 0 0 0 0
AIPLANNER
COMPARISONTOTHRESHOLD
CONSTRAINTSOLVINGMODELCHECKING
DOMAINSPECIFICALGORITHM
NUMERICALOPTIMIZATION
SEARCHPROCEDURE
SEMANTICREASONING
UTILITYCALCULATION
I9.Adap..Logic
I9.Adap..Logic
Frequency
20
10
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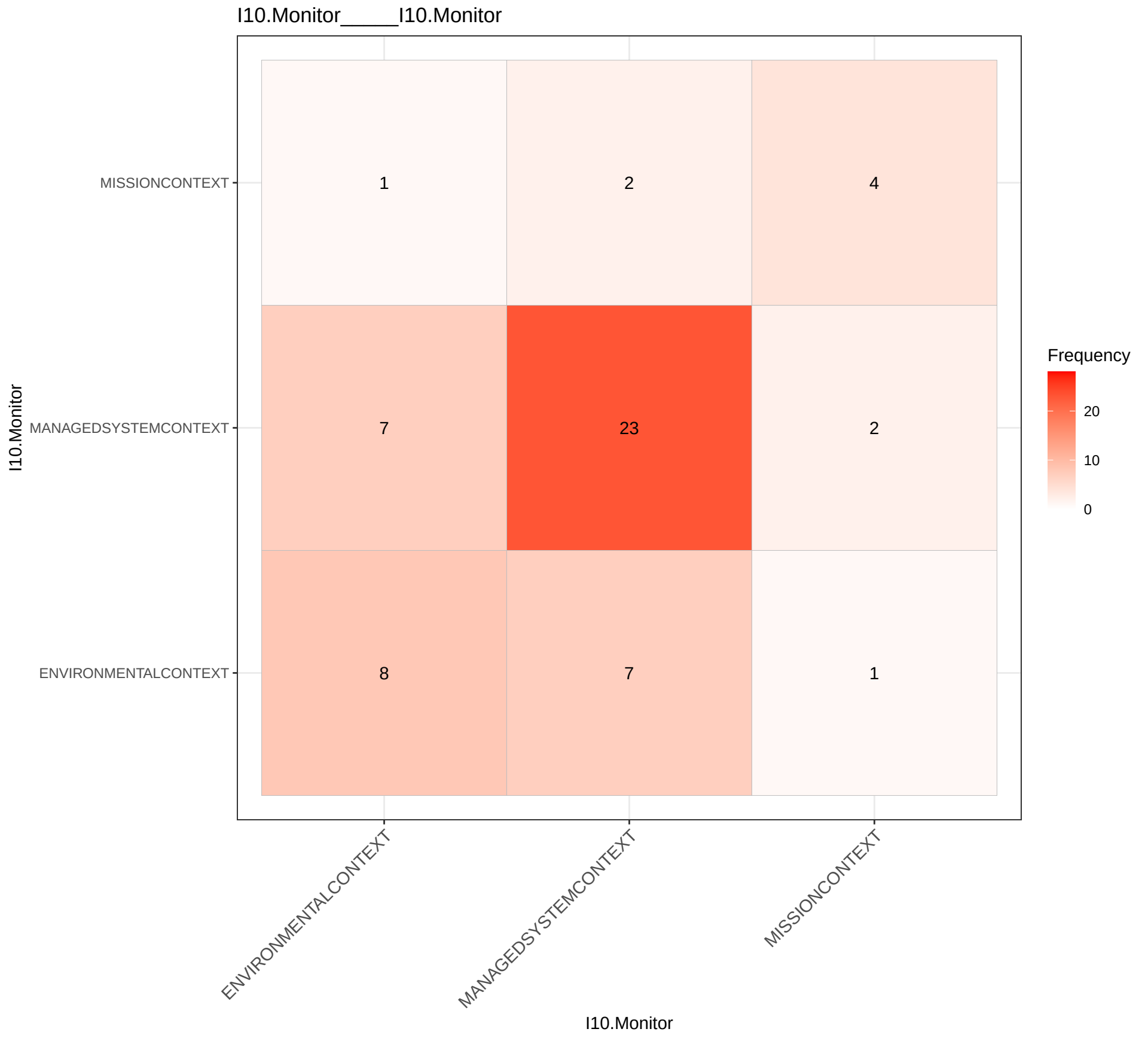
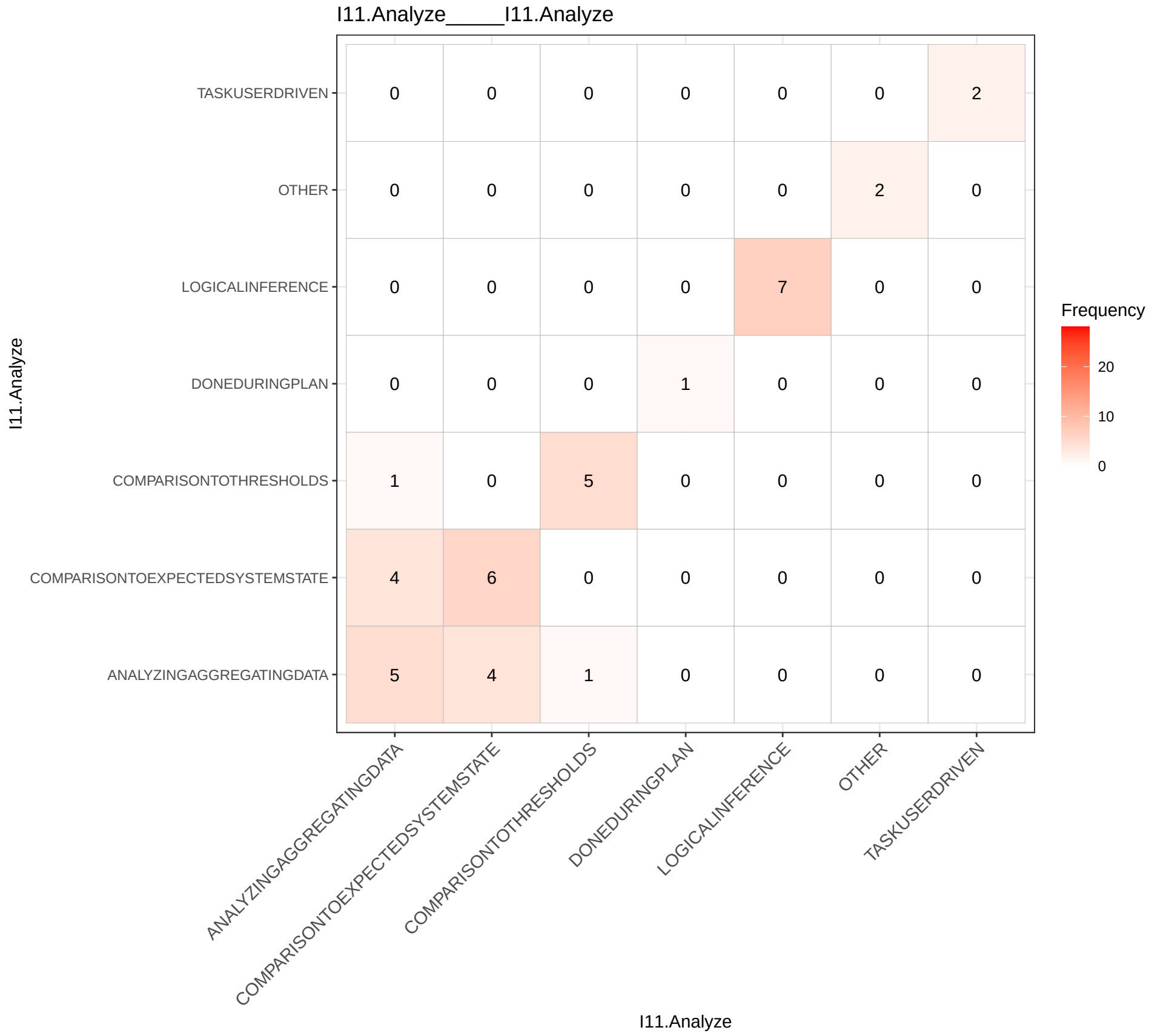

I10.Monitor_____I10.Monitor
MISSIONCONTEXT
MANAGEDSYSTEMCONTEXT
ENVIRONMENTALCONTEXT
1
2
4
7
23
2
8
7
1
I10.Monitor
ENVIRONMENTALCONTEXT
MANAGEDSYSTEMCONTEXT
MISSIONCONTEXT
I10.Monitor
Frequency
20
10
0


I11.Analyze_____I11.Analyze
TASKUSERDRIVEN
OTHER
LOGICALINFERENCE
DONEDURINGPLAN
COMPARISONTOTHRESHOLDS
COMPARISONTOEXPECTEDSYSTEMSTATE
ANALYZINGAGGREGATINGDATA
0 0 0 0 0 0 2
0 0 0 0 0 2 0
0 0 0 0 7 0 0
0 0 0 1 0 0 0
1 0 5 0 0 0 0
4 6 0 0 0 0 0
5 4 1 0 0 0 0
ANALYZINGAGGREGATINGDATA
COMPARISONTOEXPECTEDSYSTEMSTATE
COMPARISONTOTHRESHOLDS
DONEDURINGPLAN
LOGICALINFERENCE
OTHER
TASKUSERDRIVEN
I11.Analyze
I11.Analyze
Frequency
20
10
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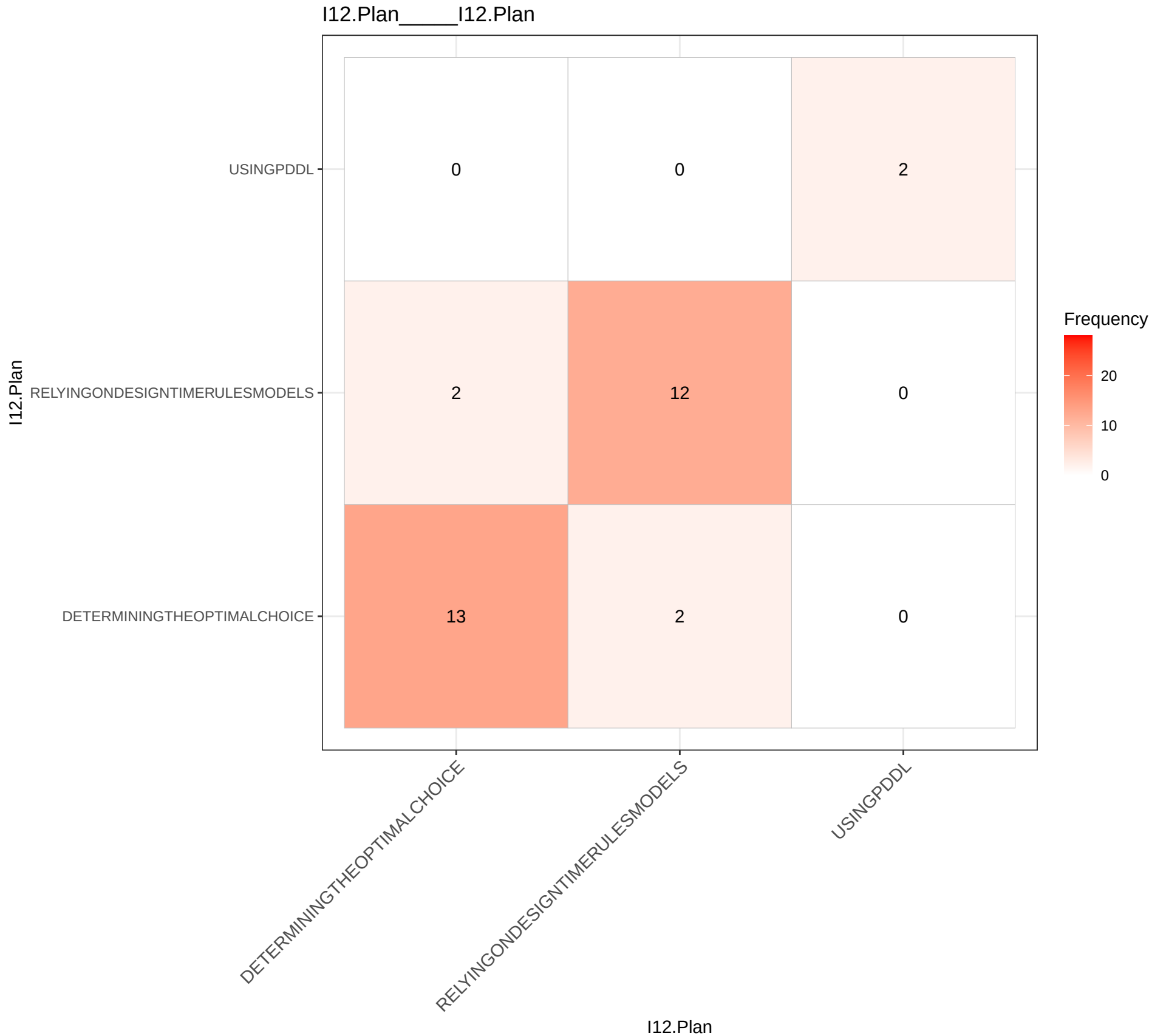
I12.Plan_____I12.Plan
USINGPDDL
RELYINGONDESIGNTIMERULESMODELS
DETERMININGTHEOPTIMALCHOICE
I12.Plan
0
0
2
2
12
0
13
2
0
DETERMININGTHEOPTIMALCHOICE
RELYINGONDESIGNTIMERULESMODELS
USINGPDDL
I12.Plan
Frequency
20
10
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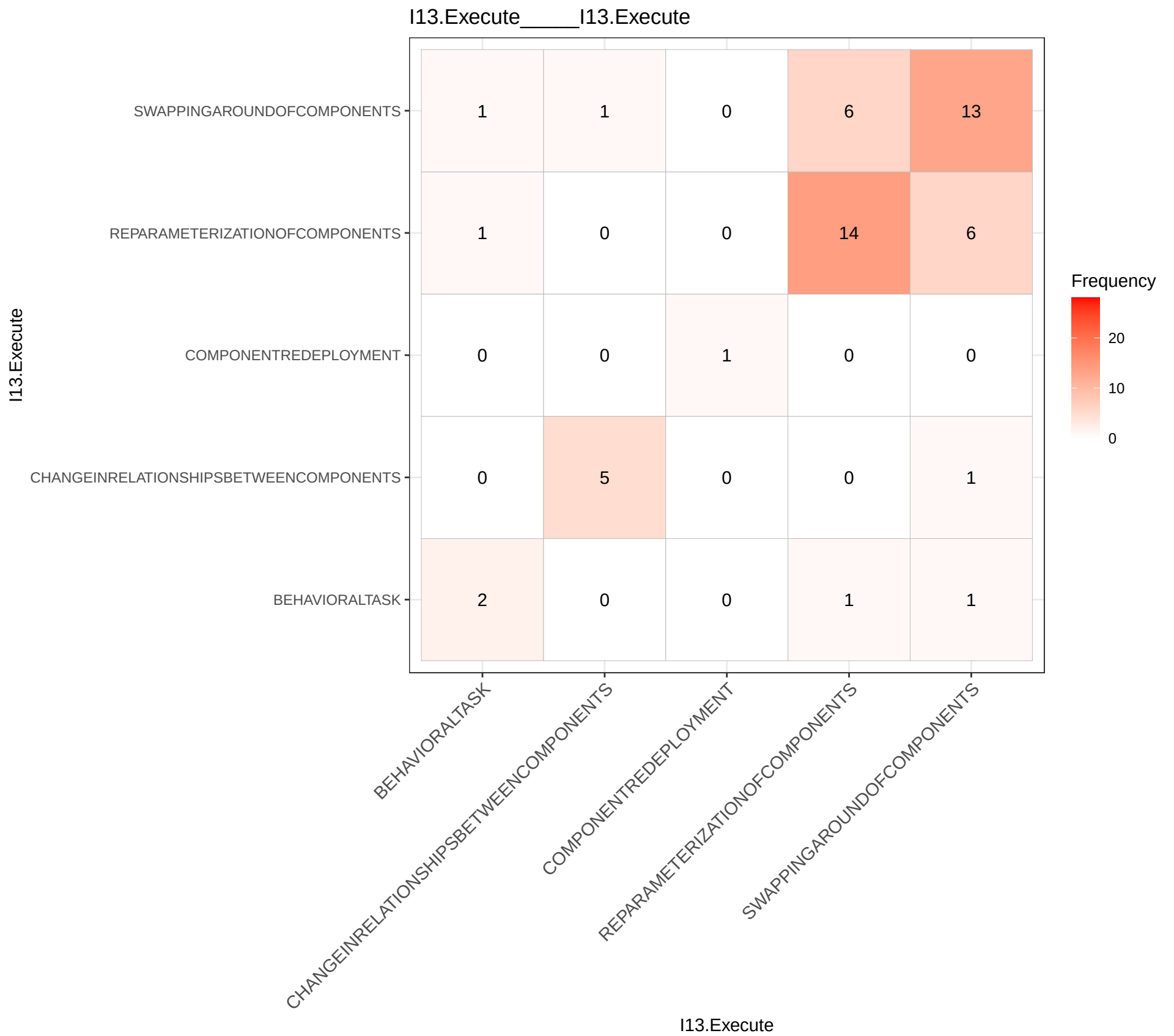
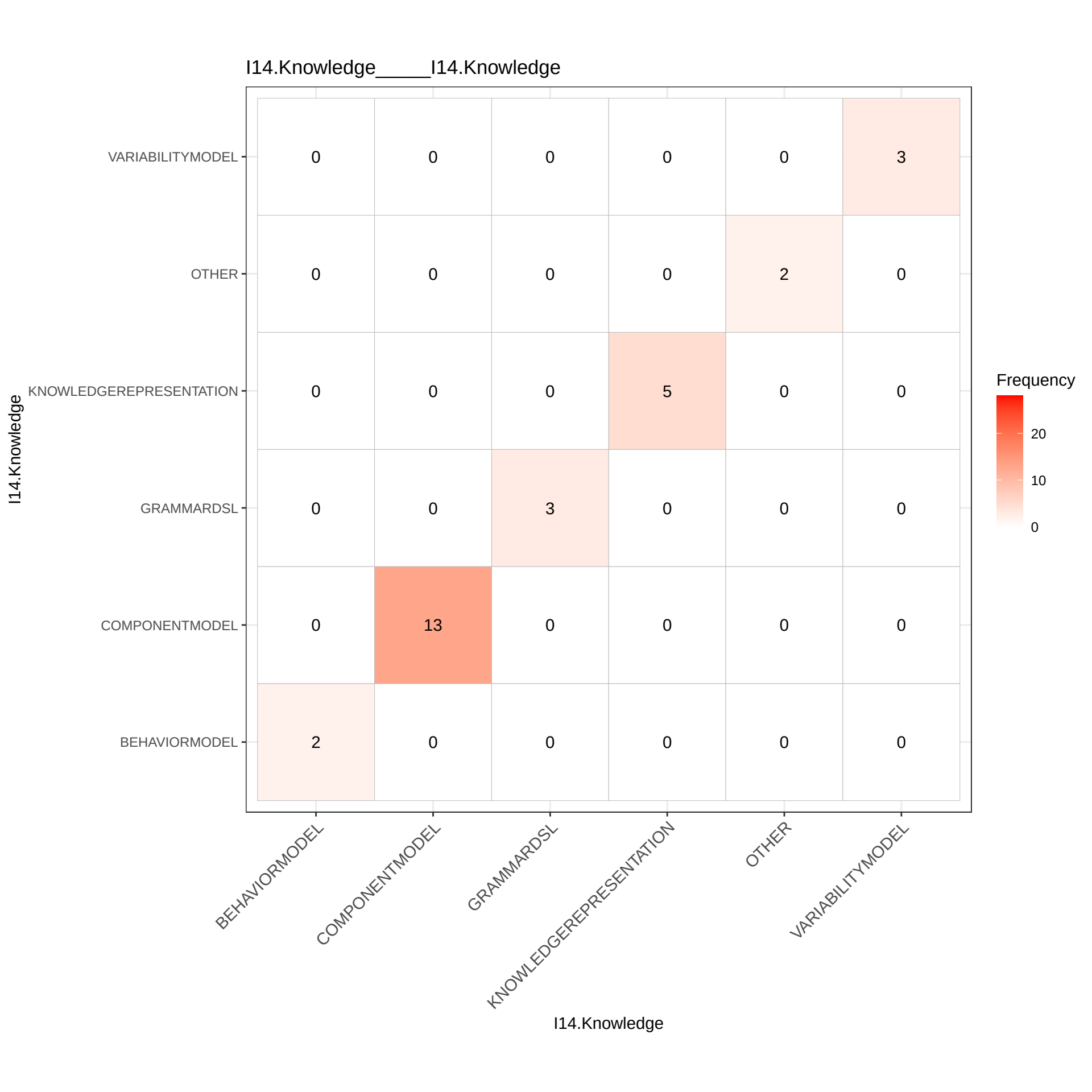

I13.Execute_____I13.Execute
SWAPPINGAROUNDOFCOMPONENTS
REPARAMETERIZATIONOFCOMPONENTS
COMPONENTREDEPLOYMENT
CHANGEINRELATIONSHIPSBETWEENCOMPONENTS
BEHAVIORALTASK
1 1 0 6 13
1 0 0 14 6
0 0 1 0 0
0 5 0 0 1
2 0 0 1 1
I13.Execute
BEHAVIORALTASK
CHANGEINRELATIONSHIPSBETWEENCOMPONENTS
COMPONENTREDEPLOYMENT
REPARAMETERIZATIONOFCOMPONENTS
SWAPPINGAROUNDOFCOMPONENTS
I13.Execute
Frequency
20
10
0


I14.Knowledge_____I14.Knowledge
VARIABILITYMODEL
OTHER
KNOWLEDGEREPRESENTATION
GRAMMARDSL
COMPONENTMODEL
BEHAVIORMODEL
I14.Knowledge
0 0 0 0 0 3
0 0 0 0 2 0
0 0 0 5 0 0
0 0 3 0 0 0
0 13 0 0 0 0
2 0 0 0 0 0
BEHAVIORMODEL
COMPONENTMODEL
GRAMMARDSL
KNOWLEDGEREPRESENTATION
OTHER
VARIABILITYMODEL
I14.Knowledge
Frequency
20
10
0