Package 'plspm.formula'

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Type Package

Title Formula Based PLS Path Modeling

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Description The main objective is to make easy the PLS Path Modeling with R using the package 'plspm'. It compute automatically the inner matrix and the outer list the 'plspm' function need simply by specify the model using formulas.

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plspm.formula-package *Formula Based PLS Path Modeling*

Description

The main objective is to make easy the PLS Path Modeling with R using the package 'plspm'. It compute automatically the inner matrix and the outer list the 'plspm' function need simply by specify the model using formulas.

Details

A formula based version of the package 'plspm'.The main fonction is 'plspm.formula' based on the plspm function.

Author(s)

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References

Gaston Sanchez, Laura Trinchera and Giorgio Russolillo (2015). plspm: Tools for Partial Least Squares Path Modeling (PLS-PM). R package version 0.4.7. http://CRAN.R-project.org/package=plspm

See Also

plspm.formula

bkadulte *Adult Resilience Dataset From Bouake (Ivory Coast)*

Description

This data set contains the variables from a resilience study of 117 adult people in the town of Bouake (Ivory Coast). A data frame with 117 observations on the following 22 variables.

Usage

```
data("bkadulte")
```

Details

In the context of the resilometric, the variables are all manifests variables and can be classify into five groups (five resilience dimensions):

- `SDH` sens of humor (senshum, creativite)
- `APS` pro-social attitude (communic, sociabilite, altruiste)
- `HRP` hability to solving problems (planific, solution, autonome)
- `SCI` sentiment of internal control (estime, confiance, favenir)
- `SPI` spirituality (optimisme, persever, religion)

Source

UMI Resilience (CIRES-IRD), observatory of resilience in Bouake (Ivory Coast)

References

COULIBALY Kpinna Tiekoura, Odilon Yapo M. ACHIEPO, Brou Konan Marcellin, Michel Babri. (2015). Resilometrical modeling of interactions in social resilience dimensions. International Journal of Computer Science Issues (IJCS), Volume 12, Issue 4, July 2015. http://www.ijcsi.org/papers/IJCSI-12-4-149-155.pdf

Examples

```
## Load data
data(bkadulte)
str(bkadulte)
bkmodele <- "
             ## modele de mesure
              SDH =~ senshum+creativite
              APS =~ communic+sociabilite+altruiste+relation
              HRP =~ planific+solution+autonome
              SCI =~ estime+confiance+favenir
              SPI =~ optimisme+persever+religion
            ## interactions
              HRP ~~ SDH+SCI
              SCI ~~ SDH
              APS ~~ SDH
              SPI ~~ APS+SCI
          "
## PLSPM estimation based on formula
bkmodes <- rep("A",5)
bkres.plspm <- plspm.formula(Formula = bkmodele, Data = bkadulte, modes = bkmodes,
                        plot.outer = TRUE, plot.inner = TRUE, scaled = FALSE)
## Computation plspm parameters only based on formula
bkres.param <- plspm.params(Formula = bkmodele, Data = bkadulte)
bkres.param$inner.mat
bkres.param$outer.list
```

plspm.formula *PLS Path Modeling Based on Formula*

Description

This fonction estimate PLS Path Models specified using formula. The formulas using for the inner models and the outer models must respect the forms describe in the details section.

Usage

```
plspm.formula(Formula,Data,modes=NULL,scaling=NULL,scheme="centroid",
              scaled=TRUE,tol=1e-06,maxiter=100,plscomp=NULL,boot.val=FALSE,
              br=NULL,dataset=TRUE,plot.outer=FALSE,plot.inner=TRUE)
```

Arguments

Formula	A string describe the the inner and outer model using formulas. The inner models are describe using "=~" and "~~" for the inner model. (see details and example)
Data	matrix or data frame containing the manifest variables.
modes	character vector indicating the type of measurement for each block. Possible values are: "A", "B", "newA", "PLScore", "PLScow". The length of modes must be equal to the length of blocks.
scaling	optional argument for runing the non-metric approach; it is a list of string vectors indicating the type of measurement scale for each manifest variable specified in blocks. scaling must be specified when working with non-metric variables. Possible values: "num" (linear transformation, suitable for numerical variables), "raw" (no transformation), "nom" (non-monotonic transformation, suitable for nominal variables), and "ord" (monotonic transformation, suitable for ordinal variables).
scheme	string indicating the type of inner weighting scheme. Possible values are "centroid", "factorial", or "path".
scaled	whether manifest variables should be standardized. Only used when scaling = NULL. When (TRUE, data is scaled to standardized values (mean=0 and variance=1). The variance is calculated dividing by N instead of N-1).
tol	decimal value indicating the tolerance criterion for the iterations (tol=0.000001). Can be specified between 0 and 0.001.
maxiter	integer indicating the maximum number of iterations (maxiter=100 by default). The minimum value of maxiter is 100.
plscomp	optional vector indicating the number of PLS components (for each block) to be used when handling non-metric data (only used if scaling is provided)
boot.val	whether bootstrap validation should be performed. (FALSE by default).
br	number bootstrap resamples. Used only when boot.val=TRUE. When boot.val=TRUE, the default number of re-samples is 100.

`dataset` whether the data matrix used in the computations should be retrieved (TRUE by default).

`plot.outer` Boolean specify if yes (plot.outer=TRUE) or not (plot.outer=FALSE) the outer plot may be printed. (FALSE by default).

`plot.inner` Boolean specify if yes (plot.inner=TRUE) or not (plot.inner=FALSE) the outer plot may be printed. (TRUE by default).

Details

The function plspm.formula estimates a path model by partial least squares approach providing the full set of results as the plspm function of the 'plspm' package. The algorithm compute itself the path matrix and the blocks list. To do that, the model must be specify using the two rules below:

`LatVar1 =~ ManVar1+ManVar2+ManVar3` Description of the relation between the latent variable (LatVar1) and its manifests variables (ManVar1, ManVar2 and ManVar3

`LatVar3 ~~ LatVar1+LatVar2` Description of the relation between the latent variable (LatVar3) and the other latents variables (LatVar1 and ManVar2) linked to that variable All the formulars must be in a single string with a newline as separator. Phisical new lines are generally used (see example).

Value

The result of the 'plspm.formula' is an objet of class 'plspm'. The return values are the same of the plspm fonction in the 'plspm' package.

Note

The formula approach of the PLS Path Modeling is need for the developement of the resilometric. Resilometrics is a new discipline under development for computational modeling of the resilience processes.

Author(s)

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References

Gaston Sanchez, Laura Trinchera and Giorgio Russolillo (2015). plspm: Tools for Partial Least Squares Path Modeling (PLS-PM). R package version 0.4.7. http://CRAN.R-project.org/package=plspm

See Also

plspm.params

Examples

```
## Load data (satisfaction data in plspm package)
data("plspmsat")
## Model specification by formulas
satmodele <- "
            ## measure model specification
              EXPE =~ expe1+expe2+expe3+expe4+expe5
              IMAG =~ imag1+imag2+imag3+imag4+imag5
              LOY =~ loy1+loy2+loy3+loy4
              SAT =~ sat1+sat2+sat3+sat4
              VAL =~ val1+val2+val3+val4
              QUAL =~ qual1+qual2+qual3+qual4+qual5
            ## outer model specification
              EXPE ~~ IMAG
              LOY ~~ IMAG+SAT
              SAT ~~ IMAG+EXPE+QUAL+VAL
              VAL ~~ EXPE+QUAL
              QUAL ~~ EXPE
          "
## estimation modes of latent's blocks
satmodes <- rep("A",6)
## PLSPM model estimation using formula
satres.plspm <- plspm.formula(Formula = satmodele, Data = plspmsat,
                          modes = satmodes, plot.outer = TRUE,
                          plot.inner = TRUE, scaled = FALSE)
```

`plspm.params` *Formula Based PLS Path Modeling Parameters Calculus*

Description

This fonction compute the inner matrix and the outer list need for specify the PLS Path Models in the package 'plspm' (function 'plspm'). The parameters are compute using a formula specification of the PLSPM model.

Usage

```
plspm.params(Formula,Data)
```

Arguments

`Formula`	A string describe the the inner and outer model using formulas. The inner models are describe using "=~" and "~~" for the inner model. (see details)
`Data`	matrix or data frame containing the manifest variables.

Details

The function 'plspm.formula' estimates a path model by partial least squares approach providing the full set of results as the plspm function of the 'plspm' package. The algorithm compute itself the path matrix and the blocks list. To do that, the model must be specify using the two rules below :

`LatVar1 =~ ManVar1+ManVar2+ManVar3` Description of the relation between the latent variable (LatVar1) and its manifests variables (ManVar1, ManVar2 and ManVar3

`LatVar3 ~~ LatVar1+LatVar2` Description of the relation between the latent variable (LatVar3) and the other latents variables (LatVar1 and ManVar2) linked to that variable All the formulars must be in a single string with a newline as separator. Phisical new lines are generally used (see example).

Value

A list containing two objects :

`inner.mat`	inner matrix specify the structural relations between latents variables
`outer.list`	outer list specify the indexes of the manifests variables in the dataset for each latent variable

Author(s)

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Examples

```
# Load data (satisfaction data in plspm package)
data("plspmsat")
## Model specification by formulas
satmodele <- "
            ## measure model specification
              EXPE =~ expe1+expe2+expe3+expe4+expe5
              IMAG =~ imag1+imag2+imag3+imag4+imag5
              LOY =~ loy1+loy2+loy3+loy4
              SAT =~ sat1+sat2+sat3+sat4
              VAL =~ val1+val2+val3+val4
              QUAL =~ qual1+qual2+qual3+qual4+qual5
            ## outer model specification
              EXPE ~~ IMAG
              LOY ~~ IMAG+SAT
              SAT ~~ IMAG+EXPE+QUAL+VAL
              VAL ~~ EXPE+QUAL
              QUAL ~~ EXPE
          "
## computer the PLSPM parameters
sat.param <- plspm.params(Formula = satmodele, Data = plspmsat)
sat.param$inner.mat  ## inner matrix
sat.param$outer.list  ##  outer list
```

`plspmsat` *The Satisfaction Dataset*

Description

This data set contains the variables from a customer satisfaction study of a Spanish credit institution on 250 customers.

Usage

```
data("plspmsat")
```

Details

See details on satisfaction

Source

Laboratory of Information Analysis and Modeling (LIAM). Facultat d'Informatica de Barcelona, Universitat Politecnica de Catalunya.

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