No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
1	LA LOGÍSTICA INVERSA COMO HERRAMIENTA PARA LA GESTIÓN DE RESÍDUOS DE LOS SUPERMERCADOS DE VENTA AL POR MENOR	2017	1. Marta Pagán Martínez 2. Karina Tonelli Silveira Dias 3. Sergio Silva Braga Junior 4. Dirceu da Silva	Logística Inversa; Reciclaje; Residuos Sólidos; Sostenibilidad; Supermercado de Venta al por Menor.	El objetivo de esta investigación fue analizar las prácticas de logística inversa llevadas a cabo por los supermercados de venta al por menor del Estado de São Paulo, y cuantificar el volumen de residuos que dejan de ser desechados en el medio ambiente. Para alcanzar dichos objetivos, se llevó a cabo una investigación exploratoria, cuantitativa y cualitativa siguiendo un método de estudio de casos, tomando como unidades de análisis tres supermercados y basado en la observación directa durante un período de seis meses. Se observó, durante ese tiempo, la práctica de logística inversa realizada en cada supermercado para cuantificar la reducción del nivel de contaminación mediante la eliminación adecuada de determinados materiales (plástico y cartón). Para esto, fue utilizado en el análisis de los datos el método Material Input Per Service (MIPS) desarrollado en el Instituto Wuppertal para cuantificar los datos de acuerdo con los materiales producidos (bióticos y abióticos) y la cantidad de agua y aire que deja de ser contaminada. Como resultado se constató que la totalidad de los supermercados estudiados dejaron de generar alrededor de 220 toneladas de materiales bióticos y abióticos durante el período observado, además de una gran cantidad de agua y aire que dejaron de ser contaminados. A través de los resultados, se percibe la gran importancia que la logística inversa tiene para la preservación del medio ambiente.	Brasil	Logistica Inversa
2	La gestión de la logística inversa en las empresas españolas: Hacia las prácticas de excelencia	2012	1. Mihi-Ramírez 2. Arias-Aranda 3. Jesús García-Morales	Logística, logística inversa, gestión de las devoluciones, distribución, gestión de operaciones logísticas	En esta investigación se analiza la implantación de prácticas de Logística Inversa en empresas españolas analizando su situación actual con el objetivo de examinar aquellas que están influyendo de manera más significativa en la gestión de las actividades de Logística Inversa. El estudio se ha realizado con una muestra multisectorial de empresas españolas cuyos resultados reflejan la gran variedad de actividades de Logística Inversa por sectores de actividad y un incremento de la gestión de los materiales retornados y de la inversión en sistemas de Logística Inversa, especialmente en las empresas más proactivas.	España	Logistica Inversa
3	REVISIÓN DE ESTUDIOS DE CASO DE CARÁCTER CUALITATIVO Y EXPLORATORIO EN LOGÍSTICA INVERSA	2013	1. Eduin Contreras Castañeda 2. Rafael Tordecilla Madera 3. Julián Silva Rodríguez	estudios de caso; investigación cualitativa; logística inversa; revisión bibliográfica.	Este artículo presenta una revisión de literatura sobre estudios de caso de carácter exploratorio y cualitativo desarrollados en diferentes sectores industriales en la temática de Logística Inversa (LI), a través del análisis de contenido de bibliografía publicada. Se hizo uso de varias bases de datos para la búsqueda de artículos de investigación relacionados con el tema objeto de estudio, los cuales fueron clasificados principalmente de acuerdo con el sector de la economía abordado en su investigación. La revisión llevada a cabo permite conocer qué herramientas metodológicas son utilizadas para el desarrollo de estudios de caso de carácter cualitativo y exploratorio, y muestra que los estudios basados en investigación empírica permiten conocer a fondo el desarrollo y aplicación de LI en la industria. Además, los diversos trabajos indagados resaltan la importancia de realizar investigaciones basadas en métodos cualitativos para analizar los problemas relacionados con LI.	Colombia	Logistica Inversa
4	DISEÑO DE UN SISTEMA DE LOGÍSTICA INVERSA PARA LA RECOLECCIÓN DE ENVASES Y EMPAQUES VACÍOS DE PLAGUICIDAS.	2013	1. Contreras Castañeda, Eduin Dionisio 2. Fraile Benítez, Ana Mercedes 3. Silva Rodríguez, Julián David1	Logística inversa, gestión de procesos, ISO, manejo de residuos de plaguicidas, Pantano de Vargas, Usochicamocha – Boyacá	Este documento presenta los resultados finales de una investigación adelantada en el sector del Pantano de Vargas del Departamento de Boyacá - Colombia, el cual enfrenta un problema a causa del mal manejo y tratamiento que se le viene dando a los envases y empaques vacíos de plaguicidas por parte de los agricultores, causando contaminación en el medio ambiente. Debido a lo anterior, se planteó como objetivo principal realizar el diagnóstico del proceso de recolección y disposición final de los residuos generados, que permita el diseño de un proceso de Logística Inversa para los envases y empaques vacíos de plaguicidas en esta unidad de riego. Para lograr el objetivo propuesto se recolectó información mediante rastreo bibliográfico, observación directa y encuestas dirigidas a proveedores, agricultores y recolectores de los residuos en la zona de estudio. Además, se revisó la normativa legal aplicable a la recolección de envases vacíos de plaguicidas. Asimismo, se obtuvo la descripción gráfica de la recolección actual y se plantea la caracterización de un proceso de Logística Inversa. Entre los principales hallazgos, se evidenció que los actores que participan en el proceso de recolección y disposición final de los residuos de plaguicidas, no están cumplimiento con la normativa estipulada, y se observa que el proceso realizado actualmente es empírico y no tiene en cuenta actividades propias de la logística inversa. Se propone un proceso documentado bajo los lineamientos de la norma NTC-ISO 9001:2008, que permita la mejora continua del mismo.	Colombia	Logistica Inversa
5	Logística inversa un proceso de impacto ambiental y productividad	2010	1. Montoya, Rodrigo Andrés Gómez	logística inversa, cadena de suministro, TIC	El presente artículo de revisión busca describir y analizar la logística inversa desde un enfoque conceptual, de procesos y aplicaciones en los niveles nacional e internacional, incluyendo la relación con la Gestión de Cadena de Suministro Verde. La metodología empleada consiste en la revisión y análisis de libros, artículos científicos y casos de estudios relacionados con el tema. Los resultados obtenidos permiten identificar la importancia de la logística inversa como estrategia para que las cadenas de suministro y empresas en los ámbitos nacional e internacional protejan el medio ambiente y gestionen adecuadamente las devoluciones, con el fin de operar eficientemente y recuperar valor a los productos, a través de procesos de reciclaje, reúso y disposición, entre otros. Además, se observa la existencia de decretos y normas que regulan la gestión de residuos en Colombia.	Colombia	Logistica Inversa
6	LOGÍSTICA INVERSA POST-CONSUMO: UN ESTUDIO DE CASO EN COOPERATIVA COOTRE DE ESTEIO-RS	2017	1. Krupp, Ramon 2. da Silva, Rafael Mozart 3. Borges Vieira, Guilherme Bergmann	Logística Reversa; Pós-consumo; Cooperativa de Reciclagem; Região Sul do Brasil.	Se observa en los últimos años un aumento global en la fabricación de productos a medida, que también se han generado una alta eliminación de materiales que causan daños al medio ambiente. En este contexto, el presente estudio tuvo como objetivo identificar las prácticas de logística inversa de post-consumo realizado por una cooperativa de reciclaje en la ciudad de Esteio, Rio Grande do Sul, Brasil. Por lo tanto, un estudio cualitativo se llevó a cabo, aproximación exploratoria, la práctica mediante un estudio de caso. A partir de entrevistas y observaciones buscando información sobre las actividades de cooperación y de la forma en que se lleva a cabo sus procesos. Los resultados indican que el estudio cooperativo, reciclaje lleva a cabo diversas prácticas de RL, que son esenciales para el flujo de material inversa.	Brasil	Logistica Inversa
7	LOGÍSTICA REVERSA: UMA ANÁLISE DE ARTIGOS PUBLICADOS NA BASE SPELL	2016	1. Dutra Soares, Isabel Teresinha 2. Streck, Letiane 3. Trevisan, Marcelo 4. da Rosa Gama Madruga, Lucia Rejane	Bibliometria; Logística Reversa; Gestión Ambiental; Residuos, Reciclaje	Logística Inversa (LI) es un tema relativamente nuevo en estudios académicos y en el Brasil se destacó más con la Política Nacional de Residuos Sólidos. Este artículo tiene el objetivo de verificar, en 47 artículos de Base SPELL, publicados entre El año de 2003 hasta Septiembre de 2015, como debe haber sido estudiada la LI. Se observó que los investigadores parecen tener restricciones en investigar la LogísticaInversa en cuestiones diarias de consumo (como por ejemplo el descarte de aceite lubricante para vehículos, bombillas de luz, plástico, vidrio y empaques). La conclusión es que el tema de la Logística Inversa puede ser mucho más ampliamente explotado en razón de las diversidades y especificidades en los sectores, funciones y flujos involucrados. Futuros estudios pueden abordar más cuestiones así como el impacto de la legislación brasileña y también en acciones en pro de una logística inversa verde y eco eficiente.	Brasil	Logistica Inversa
8	DISEÑO DE REDES DE LOGÍSTICA INVERSA: UNA REVISIÓN DEL ESTADO DEL ARTE Y APLICACIÓN PRÁCTICA.	2012	1. Flórez Calderón, Luz Ángela 2. Toro Ocampo, Eliana Mirledy 3. Granada Echeverry, Mauricio	logística inversa, modelos de programación matemática, técnicas de solución, recuperación y valorización, residuos.	Este artículo presenta una revisión de diferentes modelos de programación matemática y técnicas de solución, aplicadas en la solución de problemas de diseño de redes de logística inversa, en donde se describen las principales contribuciones y se comparan varios tratamientos, modelos y algoritmos de solución. Adicionalmente, se ha desarrollado una aplicación al caso específico de la gestión de llantas fuera de uso en las ciudades de Pereira y Dosquebradas (Colombia), evaluando las alternativas que existen en la recuperación y valorización de este tipo de residuo, con el fin de incurrir en el menor costo posible y/o generar beneficios para la Región.	Colombia	Logistica Inversa
9	Diseño de cadena de abastecimiento bajo el concepto de logística inversa para el sector manufacturero de papel en la zona centro del Valle del Cauca.	2016	1. Peña Orozco, Diego Leon 2. Bolaños Carranza, Diana Fernanda 3. Salcedo Peláez, Paola Fernanda	Productos fuera de uso, industria manufacturera, cadena de abastecimiento, reciclaje, logística inversa.	Hoy en día la utilización de Productos Fuera de Uso (PFU) en la industria manufacturera de papel, ha tomado un mayor interés tanto en el ámbito de los negocios como en la investigación. Este fenómeno se ha dado gracias a la conciencia ambiental que se está estructurando en estas empresas, y también gracias al avance en la gestión de la cadena de suministro. Para la correcta recolección de los PFU, se debe diseñar una cadena de abastecimiento inversa que sea capaz de administrar o gestionar adecuadamente la recolección de estos productos, a un costo logístico menor. Dentro del diseño de la cadena de abastecimiento se tendrán en cuenta todos los componentes necesarios para la recolección del papel, tales como la localización del centro de recuperación para lo cual es necesario contar con la información de tres plantas manufactureras de papel y de centros de reciclajes ubicados en la zona centro del Valle del Cauca.	Colombia	Logistica Inversa
10	Marco integral para optimizar el efecto de las prácticas de logística inversa sobre la sostenibilidad de la cadena de suministro.	2017	1. López Vargas, Cristina 2.Perez Rubio, María Dolores	Research; Reverse logistic; Supply Chain Management; Sustainability; Descriptive statistics; Cross-sectorial study.	With growing sustainability concern in mind, firms seek to implement reverse logistic systems in their operations. However, if these practices were not properly implemented, they would be costly and even ineffective. In order to guide company efforts, the present study provide a comprehensive framework based on two dimensions. On one hand, it suits a reverse logistic management model stage-by-stage. On the other hand, the framework brings together concrete measures to optimize SC sustainability from three perspectives: operative, economical and environmental. The proposed framework thus allows to balance reverse logistic practices and SC sustainability. Furthermore, we validated it by analysing six real case in different industries. Findings highlight how reverse logistic activities may improve each SC sustainability dimension.	España	Logistica Inversa

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
11	LOGÍSTICA INVERSA, UN ENFOQUE CON RESPONSABILIDAD SOCIAL EMPRESARIAL.	2012	1. Montoya, Rodrigo Andrés Gómez 2. Espinal, Alexander Alberto Correa	Logística inversa, Responsabilidad social empresarial (Rse), medio ambiente, accionistas.	El presente artículo tiene como objetivo realizar un análisis de la relación entre la logística inversa y la responsabilidad social como estrategia para reducir los impactos en el medio ambiente y aumentar los beneficios sociales y la seguridad en los empleados, clientes y comunidad. Para alcanzar los objetivos, se consideran los temas de logística inversa y responsabilidad social desde la perspectiva teórica, y posteriormente se realiza un estudio exploratorio con empresas del área metropolitana de Antioquia que permita identificar la utilización de este enfoque, importancia e intención de su implementación. como resultado del artículo, se puede indicar que la utilización de la responsabilidad social en la logística inversa genera grandes beneficios en la cadena de suministro, ya que se desarrollan prácticas amigables con el medio ambiente, aumento potencial de la productividad y la rentabilidad de la empresa y beneficios en la comunidad. Del estudio, se identifica un bajo nivel de utilización de la logística inversa en las empresas con 13% del total de empresas encuestadas y un interés de 87% de las empresas en implementarla, debido a los impactos potenciales en la productividad, medio ambiente y beneficios en la comunidad.	Colombia	Logistica Inversa
12	BARRERAS Y PERSPECTIVAS DE LA LOGÍSTICA INVERSA DE ACEITE LUBRICANTE Y ENVASADO	2015	1. Demajorovic, Jacques 2. Alfredo Sencovici, Luis	logística inversa, lubricantes, envases, el reciclado	Este artículo tiene como objetivo discutir los principales desafíos y las perspectivas para la implementación de la logística inversa de aceite lubricante y el embalaje. La metodología se centra en la realización de entrevistas en profundidad con representante de las cadenas de estos dos productos y los resultados muestran que el avance tecnológico permite ahora la generación de un aceite re-refinado con propiedades superiores al petróleo crudo, representando ganancias económicas, sociales y ambientales, y también se puede observar avances en relación con el embalaje. Sin embargo, cuestiones como los conflictos en la cadena inversa en relación con la distribución de los gastos de recaudación, la falta de soluciones regionales a las actividades de reciclaje, una supervisión deficiente, la falta de incentivos fiscales y de bajo interés de los fabricantes en modificar sus productos y procesos privilegiando la prevención, el desafío de la expansión de la actividad logística inversa a gran escala en el país.	Brasil	Logistica Inversa
13	REVERSE AND INVERSE LOGISTIC MODELS FOR SOLID WASTE MANAGEMENT.	2017	1. Banguera, 2. Sepúlveda, 3. Fuertes, 4. Carrasco, 5. Vargas	*SOLID waste management *REVERSE logistics *CONTENT analysis (Communication) *PROBLEM solving *META-analysis	This paper presents a literature review of different models of reverse and inverse logistics for solid waste management by using the content analysis method. The article has two parts. In the first part, the studies of diverse authors are discussed to define the activities or steps to be followed for a general model of reverse and inverse logistics. These authors establish four basic steps for managing solid waste (gatekeeping, collection, sorting, and disposal). The second part deals with exploratory studies, designs, methodologies, and proposed mathematical models to solve problems in inverse logistics, based on articles published between 2010 and 2016.	Chile	Logistica Inversa
14	Modelo de Programación Lineal Multiobjetivo para la Logística Inversa en el Sector Plástico de Polipropileno.	2017	1. De la Hoz, Efraín 2. Vélez, Jorge 3. López, Ludys	índice de degradación logística inversa plástico programación lineal multiobjetivo residuos sólidos	En esta investigación se presenta un modelo de programación lineal multiobjetivo para la logística inversa del sector plástico de polipropileno. Para ello, se realizó una revisión de los referentes teóricos relacionados con el proceso de recuperación del plástico de polipropileno a partir de residuos sólidos urbanos y los desperdicios de los procesos industriales. Seguidamente se definió un modelo de programación lineal multiobjetivo el cual incorpora las variables y parámetros identificados en el diseño del proceso de logística inversa. Finalmente se hace un análisis comparativo de un caso de estudio para determinar el impacto del modelo en los resultados del programa de planeación logística. Se muestra un mejoramiento del 12,6% en los costos asociados al programa de planeación. Al mismo tiempo se optimiza el Índice de Degradación a la Procesabilidad lo que genera una buena calidad del polipropileno reciclado.	Colombia	Logistica Inversa
15	Contribución a la logística inversa mediante la implantación de la reutilización por medio de las redes de Petri.	2017	1. de la Cruz, L. O. Vega 2. Marrero Fornaris, C. 3. Pérez Pravia, M. C.	Logística inversa, reutilización, modelado de procesos, redes de Petri, envases.	Este artículo presenta una aplicación de las redes de Petri para la implantación de la logística inversa, mediante la reutilización. Siguiendo esta pauta se plantea la simulación de la reutilización de los envases en una línea de producción de helados, mediante el estudio del comportamiento dinámico del proceso, así como la validación de su comportamiento. Como resultado se destaca el perfeccionamiento de la reutilización en el proceso logístico de la empresa de servicios lácteos Rafael Freyre de Holguín, incrementando sus beneficios, como productividad y utilidades.	Cuba	Logistica Inversa
16	Modelos de optimización para el diseño sostenible de cadenas de suministros de reciclaje de múltiples productos.	2016	1. Feitó Cespón, Michael 2. Cespón Castro, Roberto 3. Rubio Rodríguez, Manuel Alejandro	diseño de la cadena de suministros, logística inversa, modelo de optimización, sostenibilidad	Este trabajo presenta un modelo multiobjetivo no lineal entero mixto (MINLP) para el diseño sostenible de cadenas de suministro para el reciclaje de varios materiales. En él se integran objetivos económicos y medioambientales para soportar la toma de decisiones estratégicas y tácticas tales como la localización de instalaciones, el diseño de los flujos materiales y la selección de medios de transporte. La evaluación del impacto medioambiental se realiza a través de la metodología de Análisis del Ciclo de Vida (LCA) utilizando el Ecoindicador 99. Se modeló un caso de estudio para la cadena de reciclaje de dos tipos de plástico, utilizando el método de las restricciones para obtener la frontera de Pareto. En el desarrollo del caso se mostraron indicadores que permiten evaluar las soluciones encontradas y así facilitar el proceso de toma de decisiones.	Cuba	Logistica Inversa
17	Procedimiento de mejora de la cadena inversa utilizando metodología seis sigma.	2017	1. Dubé-Santana, Marialys 2. Hevia-Lanier, Francis 3. Michelena-Fernández, Ester 4. Ivis Suárez-Ordaz, Daiana 5. Puerto-Díaz, Oisleydis	Logística Inversa, Procedimiento, Mejora, Cadena de Suministro Inversa, metodología Seis Sigma	La investigación abordó el diseño y aplicación del Procedimiento para la Mejora de la Cadena de Suministro Inversa (CSI), basándose en la metodología Seis Sigma, para minimizar los residuos existentes en los procesos gestionándolos eficientemente, teniendo un impacto favorable sobre el medio ambiente y reducir los costos. El objetivo que se persiguió fue realizar el diseño y aplicación del procedimiento para la mejora de la CSI, basándose en la metodología Seis Sigma, específicamente en la estrategia DMAMC (Definir-Medir-Analizar-Mejorar-Controlar). Los resultados obtenidos de la aplicación del procedimiento para la mejora de la CSI de Refrescos, fundamentalmente en el proceso de recuperación de los envases de aluminio (latas de refresco de 355 ml) validaron las teorías planteadas en cada una de las etapas, reportando grandes beneficios económicos, aumentando la satisfacción de los clientes, así como la eficiencia y eficacia en la cadena.	Cuba	Logistica Inversa
18	PRÁTICAS DE GREEN LOGISTIC: UMA ABORDAGEM TEÓRICA SOBRE O TEMA.	2016	1. Engelage, Emanuele 2. Borgert, Altair 3. de Souza, Marcos Antonio	Green logistic. Prácticas de gestión socio ambiental. Sustentabilidad	Este estudio tiene como objetivo identificar las principales prácticas de la green logistic consideradas en la literatura académica nacional e internacional. Utilizando técnicas estandarizadas para la selección de estudios anteriores, en primer lugar se presenta la definición de green logistic, para diferenciarlo de otros conceptos comúnmente tratados de manera similar, como la economía circular, la gestión de la cadena verde de suministro (GSCM), logística inversa y las certificaciones ambientales (ISO 14001), para obtener claridad acerca de sus límites, alcances y profundidad. El estudio también organiza una taxonomía que involucra diferentes áreas funcionales de la empresa, apuntando las conductas sostenibles, lo que resulta en nueve componentes de la green logistic que sirven de subsidio para la clasificación de las prácticas idénticas. Con base en esta definición conceptual y en la taxonomía, lista 112 prácticas de green logistic, de las cuales 85 son de nivel empresarial, 24 del gobierno y 3 en relación a los consumidores. Con relación a la cantidad de prácticas identificadas y el número de citas, tanto en la esfera de negocios como en el gobierno, el segmento más representativo está relacionado con el transporte verde. Entre las prácticas más citadas está la búsqueda de entregas más eficientes, utilizando el transporte intermodal o multimodal que sean menos contaminantes y la programación y optimización de los flujos de entregas. El estudio también relevó que aunque el concepto de green logistic está consolidada en la literatura, la mayoría de los estudios, sobre todo los empíricos, se centra en algunos de sus componentes, en particular los de transporte y logísticainversa.	Brasil	Logistica Inversa
19	Diagnóstico ecológico y económico de la cadena de suministros para el reciclaje de plásticos en el contexto empresarial cubano.	2015	1. Feitó Cespón, Michael 2. Cespón Castro, Roberto 3. Martínez Curbelo, Gretel 4. Covas Varela, Daylí	Logística inversa Procesos de pensamiento Análisis del ciclo de vida Gestión Cadena de suministros	La cadena de suministros para el reciclaje de plásticos en Cuba ha estado presentando un bajo desempeño durante varios años, por lo tanto el objetivo de este trabajo es realizar un diagnóstico estratégico de su gestión que integre las dimensiones económicas y medioambientales. Para conseguir este propósito se utilizan los procesos de pensamiento desarrollados dentro de la teoría de las restricciones los cuales se fortalecen con el análisis del ciclo de vida, técnicas estadísticas y métodos multicriterios discretos. Los resultados del diagnóstico demostraron la necesidad de rediseñar las decisiones estratégicas teniendo en cuenta los criterios económicos integrados con los medioambientales con el fin de lograr un desempeño sostenible de la cadena de suministros estudiada.	Cuba	Logistica Inversa
20	Procedimiento para la gestión de los residuos sólidos generados en instalaciones hoteleras cubanas.	2015	1. Broche-Fernández, Yaleny 2. Ramos-Gómez, Rafael	medio ambiente, logística inversa, gestión de residuos sólidos.	Se presenta un procedimiento que permite gestionar los principales residuos sólidos generados en las pequeñas y medianas instalaciones turísticas hoteleras (PyMITH) cubanas a partir del diagnóstico del comportamiento medioambiental. Se incluye la determinación de un indicador de evaluación y establecer estrategias para la logística inversa. Los métodos utilizados partieron de un análisis teórico de las concepciones más actuales de la literatura internacional y nacional disponible. Se aplicaron técnicas, tales como: observación directa, encuestas, entrevistas individuales, técnicas de trabajo en grupo, análisis de documentos y registros. El procedimiento constituye una importante herramienta de evaluación del desempeño medioambiental de las instalaciones en el sector turístico cubano. Su correcta aplicación proporciona mejoras competitivas en la empresa para lograr una gestión adecuada de los residuos sólidos que son emitidos al medio ambiente. Esto permite alcanzar un turismo ecológicamente sostenible.	Cuba	Logistica Inversa

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
21	EVALUACIÓN DE LA GESTIÓN DE RESIDUOS PELIGROSOS (RESPEL) Y SUS IMPLICACIONES EN EL DESARROLLO SOSTENIBLE DE LAS ACTIVIDADES PRODUCTIVAS EN CINCO MUNICIPIOS DEL DEPARTAMENTO DEL QUINDÍO, COLOMBIA.	2017	1. Muñoz-Valencia, Andrea Lucía 2. Franco-Cano, Carlos Alberto 3. Triviño-Arbeláez, Héctor Fabián 4. Álvarez-León, Ricardo	Residuos peligrosos, normativa ambiental, gestor, gestión de residuos, política, departamento del Quindío, Colombia.	Objetivos: Revisar la normatividad de residuos peligrosos en Colombia, su aplicabilidad y reglamentación, en un departamento pequeño que tiene una reducida generación, con el fin de identificar los vacíos existentes y la aplicabilidad de la política ambiental nacional, así como un análisis DOFA en la aplicabilidad de la normatividad de residuos peligrosos en el departamento del Quindío, comprobando la gestión integral y sus implicaciones.Metodología: La revisión incluyó la revisión de la comprensión de la normatividad, así como la bibliografía usada en la formulación de la política, los casos exitosos en otros países y la realización de encuestas en el trabajo de campo a los generadores de residuos, con lo cual se obtuvo la información necesaria para evaluar la aplicación de la Política Nacional en el departamento del Quindío. Resultados: Se visibilizaron las realidades de los generadores de residuos peligrosos en los cinco municipios del Quindío frente a la normativa ambiental y la Política Nacional, se encontró que la normativa nacional excluye a este sector, toda vez que hace exigencias que son difíciles de cumplir, por tanto no se aplica la norma. Discusión: Actualmente, no se promueve a nivel regional y nacional, la gestión de residuos peligrosos ni las opciones que faciliten el cumplimiento de las normas específicas, sin poner en riesgo la sustentabilidad ambiental, la sostenibilidad económica y social de los generadores de residuos peligrosos en los cinco municipios del Quindío. Conclusiones: Como producto de la investigación, se propone un modelo de gestión de residuos peligrosos, con dos variables dependiendo del volumen y características de los residuos generados, que incluye el ajuste normativo, la asociatividad de los generadores, una modificación del marco tarifario (con base en la regulación de los parámetros críticos de recolección y transporte), y el acompañamiento de los sectores comprometidos con la sostenibilidad ambiental, principalmente con la capacitación, formación ambiental y fortalecimiento técnico referido al manejo de los residuos o desechos peligrosos (líquidos, gaseosos, sólidos), orgánicos (que pueden tener procesos de compostaje) e inorgánicos (que pueden ser utilizados como reciclado o reutilizados como logística reversa o inversa) y los inservibles. Existe un gran desafío para un país, en especial cuando éste se enmarca en compromisos de convenios internacionales, al no tener en cuenta la heterogeneidad de las regiones, en cuanto a las capacidades de gestión y eliminación adecuada de residuos.	Colombia	Logistica Inversa
22	REVERSE LOGISTICS OF E-WASTE IN DEVELOPING COUNTRIES: CHALLENGES AND PROSPECTS FOR THE BRAZILIAN MODEL.	2016	1. DEMAJOROVIC, JACQUES 2. FERNANDES AUGUSTO, ERYKA EUGÊNIA 3. DE SOUZA, MARIA TEREZA SARAIVA	Resíduos eletro eletrônicos; logística inversa; cartoneros; responsabilidade compartida y reciclage	Iniciativas de logística inversa de desechos eletrônicos en importantes economías como India, China y Brasil demuestram que se requieren modelos específicos de logística inversa, adaptados a la realidad local en los países en desarrollo. Este proyecto de investigacin tiene como principal objetivo discutir los desafíos y oportunidades para la implementación del modelo brasileño de logística inversa para computadoras y teléfonos celulares. Los procedimientos metodológicos incluyeron 21 entrevistas en profundidad con múltiples stakaholders como representantes gobenamentales, fabricantes, empresas recicladoras, minoristas, organizaciones coletoras de materiales reciclables. y académicos. Los resultados muestran la importancia de la nueva regulación para mejorar el diálogo entre los miembros de la cadena de suministro de electrónicos de forma a contribuir para el desarrollo del modelo brasileño de logística inversa. Sin embargo gaps tecnológicos para reaprovechamento de componentes eletroeletrónicos en Brasil, su dimensión continental, desafíos fiscales y conflictos entre organizaciones de coletores de materiales reciclables desafían la implementacion del moldelo brasileno.	Brasil	Logistica Inversa
23	Reverse logistics in the plastics subsector: Main facilitators and barriers.	2015	1. Peña Montoya, C. C. 2. Osorio Gomez, J. C. 3. Vidal Holguin, C. J. 4. Lozada, P. Torres 5. Marmolejo Rebellon, L. F	Barreras, facilitadores, residuos sólidos industriales, logística de reversa, pequeñas y medianas empresas.	Los residuos sólidos industriales (RSI) están incrementando en cantidad y complejidad, y es prioritario establecer estrategias para gestionarlos. La logística de reversa (LR) es una estrategia que permite la recuperación y reutilización de materiales, evitando el daño que los RSI causan; también organiza las actividades de gestión de residuos sólidos y apoya otras actividades como comercialización de RSI. La mayoría de las investigaciones en países desarrollados que vinculan RSI y LR se dan en el subsector de aparatos electrónicos debido a los impactos negativos sobre el ambiente; no obstante, se publica en menor cantidad acerca de los residuos plásticos. Este es el caso de Colombia, donde el subsector de plásticos se compone principalmente de pequeñas y medianas empresas (Pymes), las cuales enfrentan diversas limitaciones para su funcionamiento. En este estudio se identificaron los principales facilitadores y barreras que enfrentan las Pymes del subsector plásticos en Colombia para la implementación de programas de LR. Se llevó a cabo un estudio exploratorio en el cual empresarios valoraron los facilitadores y barreras identificados en literatura científica. Los resultados mostraron que la disponibilidad de personal capacitado para desarrollar actividades de LR es uno de los facilitadores internos más importantes, y que la falta de mercados secundarios para los materiales recuperados está entre las barreras externas. Los hallazgos contribuyen al conocimiento en un área aún en desarrollo en Colombia.	Colombia	Logistica Inversa
24	Moderated influence of return frequency and resource commitment on information systems and reverse logistics strategic performance	2016	1. Ankit Mahindroo 2. Harsh Vardhan Samalia 3. Piyush Verma	Information systems, Reverse logistics, Moderation, Resource commitment, Return frequency, Strategic performance	Purpose Reverse logistics (RL) is a strategic instrument across industries. The rapid evolution of online marketplaces has led to frequent product returns with variations across diversified businesses. These marketplaces have caused potential losses due to fraudulent returns, hence requiring a commitment of resources to RL. With information systems (IS) playing a role in improved supply chain performance, the purpose of this paper is to analyse the impact of a conceptualized IS framework on achieving RL strategic outcomes, under the individual moderating influence of resource commitment (RC) and return frequency.Design/methodology/approach Data have been collected through a questionnaire from top to middle management executives managing the supply chain, logistics and IS. Moderated regression analysis was conducted on the collected sample using Hayes' (2013) process modeling.Findings The study depicts that IS capability, IS for logistics, IS partnership quality and IS for value addition lead to RL strategic benefits. Also, return frequency and RC act as relatively strong moderators with a negative impact. When analyzed for the individual IS constructs, RC has a stronger moderating impact than return frequency.Practical implications The IS usage framework can be used effectively by practitioners for enhancing strategic RL performances depending on variations in committed resources and return frequency for individual industries.Originality/value The study proposes an IS usage framework for achieving enhanced RL strategic outcomes and emphasizes on the moderating role played by RC and return frequency for producing the results	India	Logistica Inversa
25	Combining or separating forward and reverse logistics	2018	1. Zaza Nadja Lee Hansen 2. Samuel Brüning Larsen 3. Anders Paarup Nielsen 4. Anders Groth 5. Nicklas Gregers Gregersen 6. Amartya Ghosh	Supplier relations, Supply chain management, Reverse supply chain, Suppliers, Reverse logistics, Case study research, Conceptual development	Purpose While forward logistics handles and manages the flow of goods downstream in the supply chain from suppliers to customers, reverse logistics (RL) manages the flow of returned goods upstream. A firm can combine RL with forward logistics, keep the flows separated, or choose a position between the two extremes. The purpose of this paper is to identify the contextual factors that determine the most advantageous position, which the paper refers to as the most advantageous degree of combination.Design/methodology/approach The paper first develops a scale ranging from 0 percent combination to 100 percent combination (i.e. full separation). Second, using the contingency theory the paper identifies the contextual factors described in RL-literature that determine the most advantageous degree of combination. The set of factors is subsequently tested using a case study, which applies a triangulation approach that combines a qualitative and a quantitative method.Findings The results show six distinct contextual factors that determine the most advantageous degree of combination. Examples of factors are technical product complexity, product portfolio variation, and the loss of product value over time.Practical implications For practitioners the scale of possible positions and set of contextual factors constitute a decision-making framework. Using the framework practitioners can determine the most advantageous position of the scale for their firm.Originality/value Much RL-research addresses intra-RL issues while the relationship between forward and RL is under-researched. This paper contributes to RL theory by identifying the contextual factors that determine the most advantageous relationship between forward and RL, and proposes a novel decision-making framework for practitioners.	Denmark	Logistica Inversa

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
26	Reverse supply chain practices in developing countries: the case of Morocco.	2018	Jamal El Baz Regina Frei Issam Laguir	Developing countries, Case studies, Reverse logistics, Reverse supply chains	Purpose The purpose of this paper is to investigate reverse supply chain (RSC) practices and their obstacles using case studies of Moroccan companies. The authors present the main findings of case studies' analysis along with a discussion of an RSC framework for further directions of research.Design/methodology/approach A qualitative approach was adopted and semi-structured interviews with Moroccan companies were conducted using an interview guide.Findings The authors present an RSC model that encompasses remanufacturing, refurbishing and disposal processes. The authors believe that this model would constitute a promising framework for further research. The findings show that the successful implementation of RSC depends on many factors, but the company's attitude (proactive or conservative) is one of the most critical determinants in RSC initiatives. Furthermore, the results of the case studies indicate two types of inhibitors: external and internal. These findings confirm the results of previous research on environmental sustainability obstacles in general and RSC obstacles in particular.Research limitations/implications This study has some limitations that provide future research opportunities. Because this study is qualitative, further statistical support is needed to justify wider generalisation of its findings. Further studies might therefore investigate RSC practices in developing countries other than Morocco to increase the external validity of the results.Practical implications The findings can help firms to gain better understanding of their RSC and particularly the link between forward and RSCs. Consequently, companies can upgrade their business models to better control their RSC activities.Originality/value The relevant literature about RSC practices has mainly targeted manufacturing sectors in developed countries, and few studies have been conducted on developing countries. Research on RSC practices in developing countries in general and African countries in particular is sparse. This is one of the first articles written to address this gap by investigating RSC practices in Morocco.	Marruecos	Logistica Inversa
27	A capacitated plant location model for Reverse Logistics Activities.	2017	1. Coelho, Ellen Kenia Fraga1 2. Mateus, Geraldo Robson1	Algorithms Benders decomposition Reduction tests Reverse logistics	Product remanufacturing is one of the most profitable activities in reverse logistics. Running a business plan, in which companies take responsibility for the waste generated at their end-of-life products, involves making important strategic decisions. One of the challenges in planning the reverse flow of products is decide where installing the reprocessing facilities. This decision influences directly the transport variables costs and the facilities installation fixed costs. This paper proposes a model for the Capacitated Plant Location Problem in Reverse Logistics(CPL-RL), in which we assume that offered material in each collection center is aimed at a single facility for reprocessing. This restriction includes specific cases where there is no logistic availability in the network to send the collected material to different locations. The Mixed Integer Problem (MILP) is solved using an algorithm in two steps. In the first step, reduction tests are performed, which ones determine a priori which facilities are opened/closed. If all facilities are fixed opened or closed then the solution is optimal. Although not all facilities can have their status defined that way, the resultant problem has a less number of variables and it is solved using Benders method. The dataset was randomly generated and the results showed that the applied techniques are appropriate, achieving the optimal solution for all test problems.	Brasil	Logistica Inversa
28	A hybrid artificial bee colony for optimizing a reverse logistics network system.	2017	1. Li, Jun-qing 2. Wang, Ji-dong1 3. Pan, Quan-ke2 4. Duan, Pei-yong3 5. Sang, Hong-yan3 6. Gao, Kai-zhou3 7Xue, Yu4	Artificial bee colony Location allocation problem Neighborhood structure Reverse logistics network	This paper proposes a hybrid discrete artificial bee colony (HDABC) algorithm for solving the location allocation problem in reverse logistics network system. In the proposed algorithm, each solution is represented by two vectors, i.e., a collection point vector and a repair center vector. Eight well-designed neighborhood structures are proposed to utilize the problem structure and can thus enhance the exploitation capability of the algorithm. A simple but efficient selection and update approach is applied to the onlooker bee to enhance the exploitation process. A scout bee applies different local search methods to the abandoned solution and the best solution found so far, which can increase the convergence and the exploration capabilities of the proposed algorithm. In addition, an enhanced local search procedure is developed to further improve the search capability. Finally, the proposed algorithm is tested on sets of large-scale randomly generated benchmark instances. Through the analysis of experimental results, the highly effective performance of the proposed HDBAC algorithm is shown against several efficient algorithms from the literature	China	Logistica Inversa
29	Action Research in Reverse Logistics for End-Of-Life Tire Recycling	2017	1. Fagundes, Liliane 2. Amorim, Edvaldo 3. Lima, Renato	Action-research End-of-life tires Reverse logistics Waste management	At the end of their product life cycle, tires require special handling and treatment in order to avoid damaging the environment and society. Reverse Logistics (RL) is necessary to manage this type of solid waste. In Brazilian cities, collection is one of the bottlenecks. One of the main difficulties in this process is enabling joint-action between the main stakeholders: Final consumers, the government and private companies. The main objective of this paper is to identify e implement opportunities for improvement in the collection phase of end-of-life tires through action-research, involving simultaneous participation between public and private organizations. The motive for this is that the knowledge generated can serve as a basis of information and references which aid in decision-making for public authorities who need to start similar programs or improve existing ones. The Action-Research occurred in a Brazilian city with less than 100,000 inhabitants, which fits the profile of 94.91% of the country's municipalities. Final results proved the efficiency of the action-research proposal; after implementing the changes, the monthly collections grew by 50% (action), and the Action-Research team was able to generate and document knowledge which can now help other cities to improve their own processes.	Brasil	Logistica Inversa
30	Applying forward and reverse cross-docking in a multi-product integrated supply chain network.	2017	1. Rezaei, Saeid 2. Kheirkhah, Amirsaman	Efficiency Forward/reverse cross-docking Integrated supply chain Mixed integer linear programming Multi-product network Theory analysis	To come up with today's competitive priorities, companies are always looking for new ways to optimize their processes. Integrated forward/reverse supply chain management is treated as a necessary response to the call for corporate sustainability in logistics networks. Also, due to growing environmental and economic concerns, the recycling of used products is becoming a common practice. It is recently remarkable that applying cross-docking in forward logistics has been recognized as an important field of performance improvement, however, approaches to consider this strategy in the both forward and reverse contexts (simultaneously) are far lacking. To cover these gaps, this paper indicates how cross-docking can be efficiently implemented in a forward/reverse structure, and in this regards, proposes an integrated multi-product supply chain network. To study the problem, we firstly present a mixed-integer linear programming (MILP) model to minimize total costs. Secondly, to solve the obtained model, we use the general algebraic modeling system (GAMS) software. Furthermore, the model performance is evaluated through comparing the case of using forward/reverse cross-docking with that of not applying this strategy (classical approach) in the network configuration-in terms of defining two theories. Finally, the significant outcomes resulted from utilizing forward/reverse cross-docking in the network are discussed. Considered the above requirements, the model increases the efficiency of the integrated forward/reverse logistics.	Iran	Logistica Inversa
31	Pricing, collecting and contract design in a reverse supply chain with incomplete information.	2017	1. Zheng, Benrong1 2. Yang, Chao1 3. Yang, Jun1 4. Zhang, Min2	Complete and incomplete information Contract design Game theory Pricing Reverse supply chain	The significance of the reverse supply chain management and remanufacturing operations has been gaining increased attention in the literature and in practice. In this paper, we address the problem of how to make pricing, collecting and contract design decisions in a reverse supply chain, which consists of a collector and a remanufacturer. Two non-cooperative game models are established under complete and incomplete information scenarios, respectively. To begin with, we obtain the equilibrium pricing and effort decisions under complete information case. Then, the first-order conditions that the optimal acquisition price, optimal collection effort, optimal wholesale price and optimal retailing price satisfy are given under incomplete information. The result shows that the incomplete information structure might lead to an efficiency loss in the reverse supply chain. Hence, we then introduce a two-part tariff contract for the remanufacturer to motivate the collector to reveal private information, which can effectively improve the channel performance. Finally, we conduct numerical examples to compare the equilibrium solutions under different models and make the sensitivity analysis for some model parameters.	China	Logistica Inversa
32	Planning of capacity, production and inventory decisions in a generic reverse supply chain under uncertain demand and returns.	2014	1. Kaya, Onur1 2. Bagci, Fatih1 3. Turkay, Metin	capacity planning re-manufacturing reverse supply chain robust optimisation stochastic optimisation	There is a growing interest for the design and operation of reverse supply chain systems due to the cost and the legislation issues. In this paper, we address the disassembly, refurbishing and production operations in a reverse supply chain setting for modular products such as computers and mobile phones considering the uncertainties in this system, which are the return amounts of the used products and demand for final products. We develop a large-scale mixed integer programming model in order to capture all characteristics of this system, and use two-stage stochastic optimisation and robust optimisation approaches to analyse the system behaviour. In the first stage, we focus on the strategic decisions about the capacities at disassembly and refurbishing sites considering different scenarios regarding the uncertainties in the system. In the second stage, we analyse the operational decisions such as production, inventory and disposal rates. We observe through our extensive numerical analysis that the randomness of demand and return values effect the performance of the system substantially and the uncertainty of the return amounts of used products is much more important than the uncertainty of demand in this system.	Turkey	Logistica Inversa

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
33	REVERSE LOGISTICS AND GREEN LOGISTICS WAY TO IMPROVING THE ENVIRONMENTAL SUSTAINABILITY	2016	1. GECHEVSKI, Dario1 2. KOCHOV, Atanas1 3. POPOVSKA--VASILEVSKA, Sanja2 4. POLENAKOVIK, Radmil1 5. DONEV, Vanco	Green Logistics Reverse Logistics Supply Chain Sustainability	To survive in today's competitive and changeable marketplace, companies need not only to engage in their products and/or services, but also to focus on the management of the whole supply chain. Effectively managing and balancing the profitability and interconnection of each player and function in the supply chain with including the new trends will improve the overall supply chain as well as individual profit. Logistics are an important function of modern business systems. Consideration of environmental and economic aspects in supply chain design is required to reduce negative impacts on the environment caused by the increasing levels of industrialization. Also, reasons why companies choose to "go green" is that it gives the company a competitive advantage as the customers are demanding now a days that the businesses go green. In this paper, an overview of new trends such reverse logistics and green logistics, as part of green supply chain, is given with analysis of its significance in modern day systems.	Macedonia	Logistica Inversa
34	Global reverse supply chain design for solid waste recycling under uncertainties and carbon emission constraint	2017	1. Xu, Zhitao 2. Elomri, Adel 3. Pokharel, Shaligram 4. Zhang, Qin 5. Ming, X.G.3 6. Liu, Wenjie	Carbon emission Global supply chain Reverse supply chain Solid waste recycling	The emergence of concerns over environmental protection, resource conservation as well as the development of logistics operations and manufacturing technology has led several countries to implement formal collection and recycling systems of solid waste. Such recycling system has the benefits of reducing environmental pollution, boosting the economy by creating new jobs, and generating income from trading the recyclable materials. This leads to the formation of a global reverse supply chain (GRSC) of solid waste. In this paper, we investigate the design of such a GRSC with a special emphasis on three aspects; (1) uncertainty of waste collection levels, (2) associated carbon emissions, and (3) challenges posed by the supply chain’s global aspect, particularly the maritime transportation costs and currency exchange rates. To the best of our knowledge, this paper is the first attempt to integrate the three above-mentioned important aspects in the design of a GRSC. We have used mixed integer-linear programming method along with robust optimization to develop the model which is validated using a sample case study of e-waste management. Our results show that using a robust model by taking the complex interactions characterizing global reverse supply chain networks into account, we can create a better GRSC. The effect of uncertainties and carbon constraints on decisions to reduce costs and emissions are also shown.	China	Logistica Inversa
35	The rough set based approach to generic routing problems: case of reverse logistics supplier selection.	2014	1. Huang, Chun-Che 2. Liang, Wen-Yau 3. Tseng, Tzu-Liang 4. Chen, Ping-Houa	Decision rule Generic reverse logistics Label correcting algorithm Reduce reuse and recycle Rough set approach Supplier selection	In recent years, Reverse Logistics (RL) has been touted as one of the strategies of improving organization performance and generating a competitive advantage. In RL, the generic routing problem has become a focus since it provides a great flexibility in modeling, e.g., selection of suppliers by using a node as a supplier candidate in a network. To date, complicated networks make decision makers hard to search a desired routine. In addition, the traditional network defines and resolves such a problem only at one soot. The solution cannot be acquired from multiple perspectives like minimal cost, minimal delivery time, maximal reliability, and optimal '3Rs'-reduce, reuse, and recycle. In this study, rough set theory is applied to reduce complexity of the RL data sets and induct decision rules. Through incorporating the decision rules, the generic label correcting algorithm is used to solve generic routing problems by integrating various operators and comparators in the GLC algorithm. Consequently, the desired RL suppliers are selected	Taiwan	Logistica Inversa
36	Proposition of a Modeling and an Analysis Methodology of Integrated Reverse Logistics Chain in the Direct Chain.	2016	1. Mimouni, Faycal 2. Abouabdellah, Abdellah	Bayesian network graphical modeling Petri network processes reverse logistics uncertainty	Purpose: Propose a modeling and analysis methodology based on the combination of Bayesian networks and Petri networks of the reverse logistics integrated the direct supply chain. Design/methodology/approach: Network modeling by combining Petri and Bayesian network Findings: Modeling with Bayesian network complimented with Petri network to break the cycle problem in the Bayesian network Research limitations/implications: Demands are independent from returns Practical implications: Model can only be used on nonperishable products Social implications: Legislation aspects: Recycling laws; Protection of environment; Client satisfaction via after sale service. Originality/value: Bayesian network with a cycle combined with the Petri Network	Marruecos	Logistica Inversa
37	A framework for the role of warehousing in Reverse Logistics	2012	1. Dowlatshahi, Shad	case study exploratory case study research Reverse Logistics RL framework warehousing	Reverse Logistics (RL) is the process of returning products from their consumer destination to capture their value or proper disposal. This paper considers and analyses the current state of literature in warehousing. Warehousing, which is an operational factor in RL, has been analysed and evaluated in terms of the specific subfactors associated with it. The research methodology used was exploratory case study research. The qualitative data were collected by use of two in-depth case studies chosen from two different industries. The analysis of the case studies resulted in the development of warehousing subfactors, propositions and insights regarding RL operations. Based on these, a framework for effective design and implementation of RL operations is provided. This framework determines the appropriate warehousing subfactors and how the return process of products/parts works. In conclusion, the managerial implications and future research directions are provided. [ABSTRACT FROM	Estados Unid	Logistica Inversa
38	REVERSE LOGISTICS AND SUPPLY CHAINS: A STRUCTURAL EQUATION MODELING INVESTIGATION.	2015	1. Khalili-Damghani 2. Tavana, Madjid 3. Najmodin, Maryam	reverse logistic structural equation modeling supply chain performance	The process of transforming raw materials into final products and delivering those products to customers, known as supply chain (SC) management, is becoming increasingly complex. Most of SC management research has been concerned with procurement and production. However, recently, it has become increasingly important to extend SC issues beyond the point of sale to reverse logistic (RL) where the flow of returned products is processed from the customers back to the collection centers for repair, remanufacturing or disposal. We propose a conceptual framework and empirically investigate the relationship between the key factors in RL and SC performance measurement using a series of hypotheses. Structural equation modeling (SEM) is used to test the hypotheses. The results reveal insightful information about the effects of RL factors on the SC performance.	Iran	Logistica Inversa
39	A Genetic Algorithm for Reverse Logistics network design: A case study from the GCC.	2017	1. Alshamsi, Ahmed 2. Diabat, Ali	Genetic Algorithms Metaheuristics Mixed integer programming Remanufacturing Reverse Logistics	Reverse logistics (RL) involves a sequence of operations that initiate at the consumer level and terminate at the manufacturer, opposite to the traditional forward approach of the supply chain. Recycling, reuse, and re-processing of products are activities of RL networks, all of which are becoming increasingly prevalent due to growing environmental and socio-economic concerns. Research has begun to study such networks in an effort to maximize efficiency and to improve operations. Previous work focused on developing a Mixed Integer Linear Programming (MILP) with an aim of determining the optimal location and capacity of important nodes of the RL network, such as inspection centers and remanufacturing facilities. Transportation decisions, such as whether to use in-house or outsourced vehicles, are often based on cost effectiveness. The problem is formulated for the case of a household appliance in the Gulf Cooperation Council (GCC) region. Sixty-eight cities are considered, leading to a very large number of variables and constraints; thus, a heuristic approach, namely a Genetic Algorithm (GA), is chosen to solve the problem. The main contribution of this paper is to develop a very efficient GA capable of solving a large scale problem in short time. The developed GA was capable of solving a very large problem (with 656,885 continuous variables, 2040 binary variables, 10 integer variables, and 100,340 constraints) with a gap of 0.3% and about 38.5 times faster than GAMS using a personal computer. The same GA succeeded to solve both large and small problems to optimality or with a gap that didn't exceed 1.5% and faster than GAMS. The technique that we used to code the GA reduced the number of variables and constraints to 92% and 86%, respectively. Furthermore, the reported results provide important insights on practical aspects of the problem, as well as useful points for the evaluation of the heuristic's performance.	Emiratos Ara	Logistica Inversa
40	The logistics of reverse flows of secondary resources.	2014	1. Zueva, O. 2. Shakhnazaryan, S	recycling reverse logistics secondary raw materials secondary resources	This article discusses the problem of organizing the movement of secondary resource flows in the system of reverse logistics flows. Traditionally, Consumption is considered the point of origin for all types of reverse flows, however, the question remains unanswered as to whether the secondary resource flows should be distinguished within them. This problem requires solution for the proper organisation of recycling processes.	Rusia	Logistica Inversa
41	ESTUDIO DEL EFECTO DE LA ADICION DE RESIDUOS PLASTICOS EN LA FABRICACION DE BLOQUES HUECOS DE CONCRETO.	2017	1. Garcia, Samuel 2. Bracho, Nicolino 3. López, Willliam	construction Plastic waste recycling construcción reciclado Residuos plásticos	Los plásticos con mayor presencia en los residuos generados a nivel industrial son: polietileno (PE), policloruro de vinilo (PVC) y el poletilentereftalato (PET), ya que representan la mayor proporción en los materiales de uso cotidiano. Con la finalidad de aprovechar la abundancia de estos residuos, se ha planteado como alternativa eficiente el uso de ellos en la construcción, ya que al ser utilizados como agregados en las mezclas para fabricar diversas estructuras, Modifican significativamente ciertas propiedades físicas y mecánicas: disminución de peso en las estructuras fabricadas, aumento en la resistencia a la compresión de las mismas y proveen aislamiento térmico y acústico. En el siguiente trabajo se estudió el efecto de la adición de residuos de PVC y PET en la fabricación de bloques huecos de concreto artesanales. Se fabricaron bloques con 27% PET, 10.24% y 14.61% PVC respectivamente, como agente de relleno, estos fueron comparados con bloques sin residuos plásticos. A los bloques se le realizaron ensayos a la compresión, según lo dicta la norma COVENIN 42-82. Los resultados obtenidos en este ensayo muestran que la adición de los residuos favorece la disminución de peso, carga y resistencia a la compresión soportada en los bloques, sin embargo el porcentaje de absorción de humedad no presentó una tendencia concreta.	Venezuela	Botellas de plástico PET

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
42	CARACTERIZACIÓN DE LOS RESIDUOS SÓLIDOS ORDINARIOS PRESENTES EN EL ÁREA DE INTERÉS PAISAJÍSTICO ALONSO VERA (GIRARDOT, CUNDINAMARCA) Y SUS POSIBLES IMPLICACIONES AMBIENTALES.	2015	1. García Pérez, Jack Fran Armengot	solid waste WEEE Alonso Vera RAEE Residuos Sólidos	Actualmente, el manejo integral de los residuos sólidos ordinarios resulta un reto para todas las naciones del mundo, con implicaciones ambientales en el suelo, agua y atmosfera. Por lo tanto, el objetivo de este estudio fue realizar un primer análisis de los residuos sólidos (plástico, vidrio, papel, y RAEE) registrados en un pequeño relicto de bosque del área de interés paisajístico Alonso Vera, localizado en el municipio de Girardot (Cundinamarca). La recolección y clasificación de los residuos se realizó el 14 de marzo de 2013 desde las 8:00 a.m. hasta las 11:00 a.m. con un esfuerzo de captura de 10 personas/sendero-márgenes, empleando elementos de protección como guantes y tapabocas para el pesaje de los residuos. En el relicto de bosque se recolectó en un día un total de 94 kg de residuos sólidos, siendo los RAEE y plásticos los más abundantes con 24,5 kg y 17 kg respectivamente. De este modo, se concluye preliminarmente que el relicto de bosque está siendo alterado principalmente por la disposición de plásticos y RAEE, siendo preocupante que la descomposición de estos residuos representa un riego para la salud humana e integridad de los ecosistemas.	Venezuela	Botellas de plástico PET
43	Logística inversa, aplicada al manejo de residuos plásticos, como aporte estratégico del marketing verde Reverse logistics applied to waste management plastics as contribution strategic marketing green	2016	1. Murcia Florian, Jonathan Alexander 2. Rojas Gutierrez, Cristhian Camilo	Logística inversa Marketing verde PET (Tereftalato de polietileno) LOGISTICA EN LOS NEGOCIOS APROVECHAMIENTO DE RESIDUOS RESIDUOS PLASTICOS MERCADO VERDE reverse logistics green marketing Polyethylene terephthalate	En la actualidad las personas utilizan constantemente el material plástico por sus beneficios, utilidad y valor económico. Igualmente son muchas las compañías que se dedican a la fabricación de este tipo de material, el cual, les permite por su composición química, ser manipulado, adaptado a sus productos, y finalmente, obtener costos bajos de implementación. Pero son pocas las personas y especialmente las empresas que se toman el tiempo de conocer que destino tomó este material después de cumplir con su funcionalidad principal y el impacto ambiental que está generando. Cuando nos referimos a una cadena logística inversa, estamos hablando del retorno de los residuos producidos por la empresa para su reciclaje, reutilización o remanufactura, comúnmente conocido como las 3-R. (Amato, scielo, 2015). Mencionamos entonces el tema de cadena logística porque es una de las soluciones que podemos proporcionar a la problemática del impacto ambiental, solución conocida actualmente como marketing verde. En términos generales, se puede encontrar el origen del interés por la logística inversa en la injerencia del concepto de sustentabilidad en el ámbito de las organizaciones y, sobre todo, en la importancia del impacto ambiental y social de las acciones de las empresas. En este contexto, surge la recuperación y aprovechamiento de los residuos que las organizaciones generan como un especial tópico de interés, económico, social y principalmente el tema ambiental. (Amato, scielo, 2015). El enfoque de este ensayo será realizado sobre un sólido específicamente, un residuo plástico que es producido y aplicado principalmente en envases para bebidas, electrodomésticos y también utilizada en la industria textil, el cual es conocido como Polietileno Tereftalato (PET). Por consiguiente desde este punto del ensayo nos referiremos a este tipo de residuo plástico como material PET. No solo escogí este material por su aplicabilidad, también porque es uno de los residuos con mayor producción en las compañías y utilizado por los consumidores, pero debido a su composición química, su tiempo de descomposición es mucho más demorada, generando un gran daño al medio ambiente y su ecosistema. Existen empresas que han empezado a implementar no solo cadenas logísticas directas, también logísticas inversa , la cual consiste en reutilizar y volver estos residuos en materia prima, como es el caso del PET el cual es reciclado, tratado y triturado para darle una nueva utilidad. De esta manera están generando nueva materia prima con una obtención de bajos costos, y disminuyendo el impacto ambiental con responsabilidad social o mejor aún como es conocido por las empresas que se preocupan por el medio ambiente; Marketing verde.	Colombia	Botellas de plástico PET
44	EVALUACIÓN DE UNA PRÁCTICA DE AGRICULTURA URBANA CON BOTELLAS PET EN EL MUNICIPIO DE POPAYÁN	2017	1. JOSE CHAGUENDO-DORADO 2. MORALES-VELASCO, SANDRA 3. ALONSO PRADO-CERON, FABIO	Desarrollo radicular Grado de inclinación Biomassa	a investigación tuvo como objetivo evaluar tres formas de siembra en botellas PET como práctica de Agricultura Urbana en la comuna dos del municipio de Popayán. El diseño experimental fue completamente al azar en factorial de 2x3, donde se buscó encontrar la interacción entre los 2 factores que fueron las especies o cultivos sembrados (1: Cilantro - Coriandrum sativum var. Patimorado; 2: Lechuga - Lactuca sativa var. Simpson) y los grados de inclinación de la botella (1: botella horizontal, 2: botella vertical, 3: botella inclinada 45°); se sembraron dos testigos en materas para tener la comparación de referencia. Usando el programa SPSS 22, se analizaron variables agronómicas como altura, cobertura, vigor y biomasa en las especies sembradas. Se aplicaron tres pruebas estadísticas; la primera fue para determinar la homogeneidad de los datos, mediante Kolmogorov - Smirnov; la segunda fue Kruskal Wallis (p = 0,05) para hallar diferencias entre los cultivos y por último el análisis de Mann Whitney de dos muestras independientes (p = 0,05). Los resultados mostraron diferencias estadísticas significativas (p = 0,05) entre los factores, evidenciando mejor producción en la botella vertical, que registró mayores valores para vigor y peso fresco en las dos especies, debido a la relación existente entre el tamaño del recipiente y el desarrollo radicular - biomasa aérea	Colombia	Botellas pet
45	Propuesta de un procedimiento para el reciclado del polietileno de alta densidad.	2015	1. Rodríguez-Bruceta, Pablo A. 2. Pérez-Rodríguez, Ángel T. 3. Velázquez-Infante, Julio C	caracterización estructural reciclado residuos plásticos térmica y mecánica	El trabajo aborda el reciclado del polietileno de alta densidad, debido a la gran utilización en los sectores estatal y no estatal, en el municipio de Holguín. El estudio arrojó que existen dificultades en los métodos de procesamiento y que los productos obtenidos presentan propiedades disminuidas y corta vida útil. Como resultados de la investigación destaca la propuesta de un procedimiento para el manejo ambiental de los desechos plásticos, el cual se valida mediante un experimento. El material reciclado obtenido como resultado de la propuesta presenta una aceptable calidad y se encuentra apto para diferentes usos, lo que fue demostrado mediante su caracterización estructural, térmica y mecánica.	Cuba	Plástico reciclado
46	Análisis del reciclaje químico como alternativa tecnológica para la valorización y disposición final de residuos plásticos post-consumo	2017	1. Roncancio Cardona, Kelly Lizzeth 2. Ruíz Suárez, Erika Johana	Valorización Plástico Reciclaje Residuo	Colombia ha sido considerada como un país en vía de desarrollo y este progreso se ha hecho notorio en el crecimiento económico que ha tenido en los últimos años, el cual se ve reflejado en el consumo de energía, materiales, servicios y en la generación de residuos. En este último, se ha registrado un mayor incremento debido al elevado consumo de materiales plásticos, los cuales en la actualidad tienen múltiples aplicaciones debido a sus características físicas, propiedades y bajo costo. Sin embrago, a raíz de la utilización de este tipo de materiales se evidencian diferentes problematicas ambientales como la emisión de gases efecto invernadero, contaminación de suelos y cuerpos de agua; a causa de su no biodegradabilidad, los cuales se presentan durante todo su ciclo de vida [1]. Es por esto, que en el desarrollo de esta investigacion se analizan las alternativas tecnológicas existentes de reciclaje químico para la valorización y disposición final de los residuos plásticos post-consumo, con el objetivo de identificar cuáles son los desafíos ambientales y económicos que enfrenta este importante sector. De manera que sirva como base para identificar la alternativa más apropiada para el manejo de dichos materiales	Colombia	Plástico reciclado
47	How consumers of plastic water bottles are responding to environmental policies?	2017	1. Orset, Caroline a, * 2. Barret, Nicolas b 3. Lemaire, Aurélien	Biodegradable plastic bottles Bioplastic bottles Information campaign Recycling plastic bottles Regulation Willingness to pay	The consumers' willingness to pay (WTP) for different plastics used for water packaging is evaluated.•The influence of information on the consumers' WTP is studied.•Different policies and tools for protecting the environment are proposed.•With a welfare analysis, the optimal environmental policies are determined.•The impact of these policies on consumer's purchasing decisions is discussed. Although plastic induces environmental damages, almost all water bottles are made from plastic and the consumption never stops increasing. This study evaluates the consumers' willingness to pay (WTP) for different plastics used for water packaging. Successive messages emphasizing the characteristics of plastic are delivered to consumers allowing explaining the influence of information on the consumers' WTP. We find that information has a manifest effect on the WTP. We show there is a significant premium associated with recycled plastic packaging and biodegradable bioplastic packaging. As there is no consensus on the plastic which is the most or the least dangerous for the environment, we propose different policies for protecting the environment. We discuss about the impact of these policies on consumer's purchasing decisions: switching one plastic packaging for another, or leaving water plastic bottles market. We present the environmental policies that are effective according to the point of view adopted. Choosing between these policies then depends on the priorities of the regulator and pressure of lobbies	Francia	plastic bottles

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
48	Rediseño e implementación de la máquina expendedora inversa (RVM) automatizada, orientada al reciclaje de botellas plásticas PET para la Facultad de Mecánica	2015	1. Cardoso Totoy, Diego Marcelo 2. Vizcaíno Salazar, Holger Marcelo	REDISEÑO AUTOMÁTICO; RECICLAJE DE BOTELLAS; MÁQUINAS HERRAMIENTAS; TECNOLOGÍA PLÁSTICA; ANÁLISIS DE COSTOS; MONTAJE DE MÁQUINAS	El presente trabajo tiene como principal función el "Rediseño, Cálculo, Construcción e Implementación de la Máquina Expendedora Inversa (RVM) Automatizada, orientada al reciclaje de botellas plásticas (PET) para la Facultad de Mecánica - ESPOCH", el objetivo es reciclar en la máquina objeto de construcción las botellas plásticas (PET) de hasta 500 ml consumidas por los estudiantes. Las botellas plásticas compactadas al máximo, serán la base principal para la elaboración de otros tipos de productos por medio de los diferentes procesos de manufactura para cada aplicación, -siendo un aporte fundamental al cambio de la matriz productiva en el sector medio-ambiental con en este tipo de máquinas. Esta máquina está diseñada para proporcionar a la comunidad politécnica un medio rápido y fácil de reciclar correctamente las botellas, por lo que la automatización se convierte en un imperativo para satisfacer esta necesidad. La máquina fue desarrollada paulatinamente en su construcción y funcionamiento con pruebas iniciales, específicamente en el sistema mecánico de compactación para el análisis de la fuerza de compresión. Según los resultados obtenidos en las encuestas realizadas en la Facultad de Mecánica, el entregar un dulce por la máquina es de gran acogida por los estudiantes, generando un incentivo para garantizar el reciclaje. En el presente trabajo se establecen las condiciones de funcionalidad y mantenibilidad correcta para esta máquina.	Mexico	Botellas pet
49	Estudio de factibilidad para reciclar envases plásticos de polietileno tereftalato (PET), en la ciudad de Guayaquil	2010	1. Hachi Quintana, José Gabriel 2. Rodríguez Mejía, Juan Diego	RECICLAR ENVASES PLÁSTICOS INGENIERÍA AMBIENTAL TERMODINÁMICA INGENIERÍA DE LOS MATERIALES	El presente estudio tuvo como objetivo determinar la factibilidad de reciclar envases de polietileno tereftalato PET en la ciudad de Guayaquil. Para el estudio fue necesario realizar una encuesta a los habitantes de la ciudad, para la cual se empleó un muestreo estratificado por nivel socioeconómico, además se realizó un sondeo a los recicladores informales de envases PET y entrevistas con funcionarios de diferentes organizaciones privadas y gubernamentales. El estudio contempla la instalación de una planta para la producción de estos dos productos, para la cual se determinó un tamaño óptimo desde el punto de vista de costos actualizados, lo que conlleva a construir una planta con capacidad de 11.600 toneladas y esta deberá ser ampliada después de cinco años a 16.500 toneladas lo que satisfacería la demanda durante diez años. Se calculó que la instalación de la planta tendrá una duración de doce meses y según el método cualitativo por puntos aplicado para determinar la localización de la planta, esta deberá estar localizada en la zona industrial de la ciudad de Guayaquil. La inversión requerida para el proyecto es de 2´322.668 de dólares, en cuya inversión se incluye el costo de las máquinas captadoras, la tasa interna de retorno (TIR) calculada para el proyecto es de 94,19%, lo que significaría un alto grado de rentabilidad de proyecto.	Ecuador	Botellas pet
50	"PROPUESTA DE UN PROGRAMA DE MANEJO DE RESIDUOS PLASTICOS (PET) COMO ALTERNATIVA DE SUSTENTABILIDAD EN CENTROS ESCOLARES DE LA CIUDAD DE TUXPAN, VERACRUZ, MEXICO	2013	1. Norberto Servín Arellanes	Residuos plasticos pet Plan de manejo Alternativas de aprovechamientp	El estilo de vida actual ha originado la utilización poco práctica de las materias primas, de tal forma que la mayoría de las actividades generan gran cantidad de residuos. Estos residuos, pues no se diseñaron para alcanzar una mayor durabilidad y un posterior reciclaje. Debido a esto, en la actualidad uno de los principales problemas ambientales, sin duda lo constituye la considerable generación de residuos sólidos comúnmente conocidos como "basura", ya que la mayoría de las ciudades no tiene contemplado que hacer con ella, y sumado a esta situación, la velocidad de producción supera su degradación (Cabrera, 2008). Los residuos sólidos comprenden todos los desechos de origen doméstico, comercial, industrial, de vía pública y resultante de la construcción. Hay dos tipos de clasificación de los residuos sólidos urbanos de acuerdo a sus componentes, la primera se denomina basura rica, es aquella con un alto contenido en material reciclable, y la segunda es la basura pobre, la cual no puede ser reutilizada o reciclada	Mexico	Botellas pet
51	Impacto financiero generado por el reciclaje de las botellas PET en la empresa Enka de Colombia.	2017	1. Cruz Mora, Edna 2. Constanza; Ortiz 3. Hernández, Jeidy; 4. Ortiz Viáfara, Claudia Patricia;	No aplica	El presente trabajo de investigación se basa en el impacto financiero que obtiene Enka de Colombia empleando estrategias financieras y de innovación en la fabricación de sus productos, aumentando sus beneficios económicos y minimizando la contaminación ambiental; Enka centra su actividad en el reciclaje de las botellas PET con las que después de someterse a varios procesos, esté se convierte en fibras y en botellas post-consumo, al igual gracias al apalancamiento y a los beneficios de la ley 550 de 1999, pudo invertir en una planta de reciclaje con la que se ha convertido en uno de los pioneros y grandes captadores de botellas PET a nivel nacional y convertirse en una empresa sustentable económicamente.	Colombia	Botellas pet
52	Procesos de reciclaje de la Pet y su efecto en el desarrollo de la Industria Textil	2015	1. Bohórquez Castro, Karlita Verónica	ECOLOGÍA ECONÓMIA PRODUCCIÓN	Las botellas plásticas no retornables PET, han causado un gran impacto positivo referente a la economía de la industria en todo el mundo durante décadas, y a su vez un impacto negativo en el medio ambiente, ya que una botella plástica puede llegar a degradarse hasta en 100 años o más. En el Ecuador se creó el impuesto redimible a las botellas plásticas no retornables, la cual está vigente desde el año 2012, y con este impuesto se hace la devolución de $0.02 de dólar de los Estados Unidos por cada botella PET, impulsando a la ciudadanía a reciclar, lo cual ha tenido un impacto positivo en la economía del Ecuador por medio de este impuesto. Las empresas en algunos país, se están preocupando por el impacto negativo que tienen las botellas plásticas en el medio ambiente, en la actualidad se están utilizando las botellas recicladas en la industria textil transformándolas en prendas de vestir, impulsando la economía y generando empleo directo e indirecto en la recolección de las botellas plásticas en la sociedad.	Ecuador	Botellas pet
53	A reverse logistics inventory model for plastic bottles	2014	1. Nouri Matar 2. Mohamad Y. Jaber 3. Cory Searcy	Reverse logistics, Recycling, Production, Inventory management, Waste disposal, EOQ, PET, Biodegradable plastic	Purpose – The purpose of this paper is to present an original model for the production-recycling-reuse of plastic beverage bottles. Design/methodology/approach – It is assumed that discarded two-liter plastic polyethylene terephthalate (PET) bottles are collected from the market. The bottles are then sorted into non-contaminated and contaminated streams. The non-contaminated PET bottles are either remanufactured or used as regrind mixed with virgin PET to produce new bottles to satisfy varying demand. The contaminated bottles are either sold to industries using low-grade plastic or disposed of in a landfill. Numerical studies are used to illustrate the behaviour of the model, with an emphasis on exploring the reduction of total system cost and the amount of bottles going into a landfill. Findings – Numerical analyses conducted on the model found that the amount of bottles collected had the largest influence on the outcome of the total system unit time cost. Alternative materials to PET are surveyed and used to demonstrate a significant reduction in the cost of landfill disposal due to their more rapid degradation in the landfill. Research limitations/implications – Several areas for future work are highlighted. Potential modifications to the model could focus on accommodating bottles made of material other than plastic, incorporating the effects of learning on manual tasks, and on accommodating shortages or excess inventory. Originality/value – The model incorporates several unique aspects, including accounting for the cost of land use and associated environmental damage through the calculation of a present value that is charged to the manufacturer.	Canada	plastic bottles

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
54	Post-consumer plastic packaging waste in England: Assessing the yield of multiple collection-recycling schemes	2018	Hahladakis, John N. * 1. Purnell, Phil 2. Iacovidou, Eleni 3. Velis, Costas A. * 4. Atseyinku, Maryann	Circular economy Household waste Local authorities Plastic packaging Recycling Waste collection schemes	•Most LAs use fortnightly collection and collect PTTs and plastic bottles.•The contribution of KS collection scheme dominates over BSs and HWRCs.•Nearly a third of the LAs reported insufficient or poor data.•Only a mere 16% of the plastics collected are finally sent to reprocessors.•A recycling rate of approximately 23% was calculated. The European Commission (EC) recently introduced a 'Circular Economy Package', setting ambitious recycling targets and identifying waste plastics as a priority sector where major improvements are necessary. Here, the authors explain how different collection modalities affect the quantity and quality of recycling, using recent empirical data on household (HH) post-consumer plastic packaging waste (PCPP) collected for recycling in the devolved administration of England over the quarterly period July-September 2014. Three main collection schemes, as currently implemented in England, were taken into account: (i) kerbside collection (KS), (ii) household waste recycling centres (HWRCs) (also known as 'civic amenity sites'), and (iii) bring sites/banks (BSs). The results indicated that: (a) the contribution of KS collection scheme in recovering packaging plastics is higher than HWRCs and BBs, with respective percentages by weight (wt%) 90%, 9% and 1%; (b) alternate weekly collection (AWC) of plastic recyclables in wheeled bins, when collected commingled, demonstrated higher yield in KS collection; (c) only a small percentage (16%) of the total amount of post-consumer plastics collected in the examined period (141 kt) was finally sent to reprocessors (22 kt); (c) nearly a third of Local Authorities (LAs) reported insufficient or poor data; and (d) the most abundant fractions of plastics that finally reached the reprocessors were mixed plastic bottles and mixed plastics.	Inglaterra	plastic bottles
55	German plastics group highlights success of bottle deposits in recycling.	2017	1. Toloken, Steve	Plastic recycling Plastic bottles Recycling (Waste, etc.) -- Germany Plastics industries -- Germany Polyethylene terephthalate	he article discusses a study by the German trade association Forum PET about the role of container deposits in Germany's high recycling rate of polyethylene terephthalate (PET) bottles. Topics covered include the domestic recycling of most PET bottles, and customers' return of bottles via reverse vending machines. Also mentioned are comparisons with the recycling rate for PET bottles in the U.S.	Alemania	plastic bottles
56	Recycling rates fall for UBCs and plastic bottles	2017	1. Staub, C.	No aplica	The report also noted lightweighting as a challenge in driving up the plastic bottle recycling rate. Despite the negative trend, a press release from ACC and APR said clastic bottle recycling experienced a compound annual growth rate of 2.1 percert over the past five years, meaning last year's decline has not been enough to offset the recycling growth in recent years. The report's sponsors also cited a few potential positives coming out of the current struggle.	Inglaterra	plastic bottles
57	From plastic bottle recycling to policy support: An experimental test of pro-environmental spillover.	2016	1. Truelove, Heather Barnes 2. Yeung, Kam Leung 3. Carrico, Amanda R. 4. Gillis, Ashley J. 5. Raimi, Kaitlin Toner	Guilt Identity Moral licensing Pro-environmental behavior Recycling Spillover	Little research has investigated the extent to which performance of one pro-environmental behavior (PEB) spills over to increase or decrease support for pro-environmental policies or the mechanisms underlying spillover effects. In this study, 283 U.S. university students were randomly assigned via situational manipulations to either recycle a water bottle, throw the bottle in the trash, or a control condition. All participants then completed surveys assessing environmental identity, guilt, and environmental worry, as well as support for a pro-environmental campus green fund. Results showed evidence for negative spillover among Democrats only, which was mediated by environmental identity: Democrats who recycled the water bottle had lower environmental identities and were less supportive of the green fund than those in the control condition. Neither Republicans nor Independents displayed spillover. The results have implications for those interested in increasing small, easy PEBs in hopes of gaining future support for environmental policies. [	Estados Unid	plastic bottles
58	Studying the ways to reduce the harmful effects of plastic bottles in municipal solid waste on the environment in small towns	2016	1. Bayazitova, Z.E. 2. Zhaparova, S.B. 3. Mukhamadeyev, R.M. 4. Tleuova, Z.O. 5. Makeeva, L.A. 6. Yelyubayev, S.Z.	Municipal solid waste separation Plastic packaging Polyethylene terephthalate Recycling	The study was aimed at solving the following problems: lessening the negative effects of human activities on the environment, reducing the territories covered by municipal solid waste landfills (MSWLFs), and creating preconditions for the formation of infrastructure for plastic bottles recycling. A map of landfills registered in the territory of Akmola region Republic of Kazakhstan has been developed, and field studies of their morphological and fractional composition were conducted with the help of "ERA" software. During the research, the authors have applied a public opinion poll, an anonymous questionnaire and an expert assessment. The method of weight characteristics was used to choose the optimal way. As opposed to the methods of information processing used by the specialized company Credit Suisse, the employed methods allowed for the mentality of the local population. Based on the findings of the research, the authors have arrived at the following conclusions: the problem of relieving the workload on municipal solid waste landfills will become increasingly acute, and collection and recycling of plastic packaging can serve as one of the ways to decrease the amount of municipal solid waste (MSW). A novel integrated study of MSWLFs of small cities was carried out, and recommendations on collecting plastic bottles in urban areas with the population of 50,000 or less were given.	Kazakhstan	plastic bottles
59	Life cycle impact assessment of beverage packaging systems: focus on the collection of post-consumer bottles	2016	1. Simon, Bálint a, * 2. Amor, Mourad Ben b 3. Földényi, Rita a	Beverage packaging Post-consumer bottle Life cycle assessment Policy making Kerbside collection Deposit-refund system	Choice of packaging material has a significant contribution to the overall impact of beverage value chain. Collection of post-consumer packaging materials is often controlled by national or regional regulation, which have to be based on sound considerations. Therefore, stakeholders alongside the packaging value chain need for supporting information to select environmentally sound packaging and define own policy. To meet comprehensiveness, five different packaging materials were examined during their whole life cycle. Due to the potentially direct impact of collection system on the human population, and lacking information on such an analysis in recent literature, we were focussing in detail on six bottle collection systems such as kerbside bin, kerbside bag, deposit-refund, combinations with thermal compression of plastic bottles as well as an attempt made toward examining refill-bottles. Recycling allowed saving large amount greenhouse gas emission particularly in the case of aluminium can and glass-bottle. An appropriate managed packaging system supporting the bottle-to-bottle recycling can make aluminium cans beneficial in contrast to small polyethylene terephthalate bottles. From the post-consumer bottle collection point of view, the kerbside bag showed the best results followed by deposit-refund system and kerbside containers. Even though refilling of bottles leads to decreasing greenhouse gas emission, it became less significant after a certain number of reuse. It was shown that the fostering of participation of consumers in collection via aimed policy is highly important. Kerbside bag collection is the most favourable solution, although subtle differences between the distinct selective collection-systems suggested the importance of case-specific examinations. For example, using deposit-refund system resulted in excellent environmental profile, as well, like kerbside bag system. Usage of thermal compressing of plastic bottles in value chain of collection showed large environmental impacts, despite achieving significant smaller volume for transportation, which should lead to lower impacts. Furthermore, usage of refill system has to be deeply analysed to estimate the number of refills and transport distances, which allows maximizing its environmental benefits.	Hungria	plastic bottles
60	PET containers in Brazil: Opportunities and challenges of a logistics model for post-consumer waste recycling	2011	1. Coelho, T.M. 2. Castro, R. 3. Gobbo, J.A	PET bottles Recycling	The use of post-consumer materials is directly related to reducing the cost of production and extraction of natural resources. Non-recyclable materials are randomly disposed in the environment. Brazil is one of the largest consumers of PET (polyethylene terephthalate) bottles. The purpose of this paper is to describe the opportunities and challenges of the logistics model for post-consumer PET bottle recycling in Brazil, while providing knowledge of its practices along the recycling chain. The results describe the need to educate those directly and indirectly involved in the process; to reduce consumption in order to reduce the amount of waste generated; to structure the post-consumer reverse chain and engage industrial sectors and government, through public policies, to support cleaner technologies along the PET bottleproduction chain.	Brasil	plastic bottles

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
61	Post-consumer plastic bottle recycling continues to rise	2014	1. Johnson, Jim	*Recycling (Waste, etc.) *Plastic bottles industry *Waste management Plastic recycling Plastic bottles	The article reports on the growth of post-consumer plastic bottle recycling in 2013. Topics discussed include the 4.3 percent increase in the number of plastic bottles that were recycled, the anticipated growth of plastic bottle recycling in 2014, and the growing number of companies turning toward plastic bottles for packaging.	Estados Unid	plastic bottles
62	Mexico PET recycler sets ambitious 2020 goal.	2017	2. Downer, Stephen	*Business models Plastic bottles Plastic recycling Polyethylene terephthalate Plastics industries -- Mexico	The article reports on Mexican food-grade polyethylene terephthalate (PET) recycler PetStar SAPI de CV's launch of a revised sustainable business model. Topics covered include its goal of recovering and recycling all the PET bottles sent to market by its stakeholders by 2020, the achievement of zero waste, and the use of wind-generated electricity at its recycling plant. Also mentioned are PetStar stakeholders such as bottlers Arca Continental SAB de CV.	Mexico	plastic bottles
63	Advantages of Plastic Bottles Recycling.	2013	1. Popular Plastics & Packaging	*Recycling (Waste, etc.) *Emissions (Air pollution) Plastic bottles Plastic containers Poisonous gases	The article discusses the advantages of recycling plastic bottles and containers. Reusing plastic bottles and containers improve the exhaust of green house fumes, with 7.4 cubic meters of dump area stored if a ton of plastic items is reused. Some advantages of recycling plastic bottles include using for the production of products made of polyester material, preservation of power and oil preservation.	India	plastic bottles
64	Challenges and emerging solutions to the land-based plastic waste issue in Africa	2017	1. Jambeck, Jenna a, 1 2. Denise Hardesty, Britta b, * 3. Brooks, Amy L. a 4. Friend, Tessa c, 2 5. Teleki, Kristian c, 3 6. Fabres, Joan d, 4 7. Beaudoin, Yannick d 8. Bamba, Abou e, 5 9. Francis, Julius f, 6 10. Ribbink, Anthony J g, 7 11. Baleta, Tatjana g, 8 12. Bouwman, Hindrik h, 9 13. Knox, Jonathan i, 10 14. Wilcox, Chris b,	Circular economy Economic development Governance Plastics production Waste management	In recent years, there has been a tremendous increase in work that focuses on the amount and types of waste entering the marine environment from multiple geographies around the world. To date, however, there are few reports about the scale of waste entering the coastal and oceanic waters around Africa. To address this knowledge gap, existing information was collated on waste mismanagement that can become marine debris in Africa at the continental scale. This paper focuses on identifying sources and seeking solutions to waste mismanagement. Stories are shared about opportunities that have arisen and solutions that are taking place in several countries around Africa. Finally, impediments to success are discussed and sectors are described where investments can be made to significantly reduce this growing global problem. •Land-based waste entering the ocean is a significant problem in Africa•Waste mismanagement is associated with a lack of infrastructure in many African countries.•Africa has the highest population growth rate in the world, particularly in coastal areas.•In 2010, estimates of annual mismanaged waste for the African continent is 4.4 million metric tonnes.•We are seeing a shift from a linear take-make-dispose model, to a more circular approach in which plastic produces are recycled, repurposed, or reused.•Communities across Africa are developing new approaches to waste management and consolidation.•Plastic waste is being turned into retail opportunities such as making shoes from tires, upcycling plastic bottles, and making bags for schoolchildren from plastic bags.	Estados Unid	plastic bottles
65	Plastic bottle recycling by US consumers increases by 6.2% in 2012.	2013	1. Popular Plastics & Packaging	Plastic bottles Plastic recycling	The article reports on the increase of plastic bottle recycling by consumers by 6.2% to reach 2.8 billion pounds in 2012	Estados Unid	plastic bottles
66	Multiobjective waste management optimization strategy coupling life cycle assessment and genetic algorithms: Application to PET bottles	2012	1. Komly, Claude-Emma1 2. Azzaro-Pantel, Catherine2 3. Hubert, Antoine1 4. Pibouleau, Luc2 5. Archambault, Valérie	Genetic algorithm Life cycle assessment Multiobjective optimization PET bottles Waste management	Abstract: A mathematical model based on life-cycle assessment (LCA) results is developed to assess the environmental efficiency of the end-of-life management of polyethylene terephthalate (PET) bottles. For this purpose, multiobjective optimization and decision support tools are used to define optimal targets for efficient waste management. The global environmental impacts associated with the treatment of PET bottles from their cradle to their ultimate graves (incineration, landfill, recycling by mechanical, chemical or thermal processes) are computed in function of the flow of bottles in the different valorization paths. They are based on the calculation of the impacts involved in each elementary process with a LCA software tool, using the CML impact assessment method. The model takes into account the fraction λ of PET regenerated into bottles that can be further recycled, the global impacts being the cumulative impacts corresponding to each "end-of-life". A nonlinear model for the bottle waste collection stage is considered, reflecting that the more diffuse the flow of bottles is, the more difficult it is to collect and consequently, the more environmentally impacting. The resulting multiobjective problem is to find the allocation of bottles between valorization paths that minimizes the environmental impacts of bottle end-of-lives. It is solved using a genetic algorithm, and the trade-off between environmental impacts is illustrated through Pareto curves. A decision support tool then determines the best compromise among the set of solutions. The model is applied to the case of France in 2010. The variables that minimize simultaneously abiotic depletion, acidification and global warming potential are determined, in particular the number of recycling loops. The approach can be easily adapted to any specific product like bio-based plastics or organic wastes to find the optimal allocation between valorization paths.	Francia	plastic bottles
67	PET recycling increases.	2014	1. Johnson, Jim	Plastic bottles Polyethylene terephthalate Plastic recycling Recycling industry -- United States	The article reports on the increase in the number of recycled consumer polyethylene terephthalate (PET) bottles in the U.S. in 2014. Topics discussed include PET recycling rate, increase in the amount actually recycled in 2013, production capacity of PET recycling plants in 2013, and comments from Association of Postconsumer Plastic Recyclers chairman Scott Saunders and National Association of PET Container Resources program director Kate Eagles	Estados Unid	plastic bottles
68	Is PET bottle-to-bottle recycling safe? Evaluation of post-consumer recycling processes according to the EFSA guidelines	2013	1.Welle, Frank	PET bottle-to-bottle recycling Diffusion coefficients Migration modelling Safety evaluation	For almost 15 years now in Europe, used plastic bottles made of polyethylene terephthalate (PET) have been recycled in such a way that the recyclate can be used for new PET bottles. Several recycling plants have been established all over Europe. Since May 2008 the European Recycling Regulation 282/2008 has been in force. According to this regulation, every recycling process must be individually approved by the European Food Safety Authority (EFSA). For this evaluation process, EFSA has developed a conservative evaluation concept in order to protect consumers. The evaluation is partly based on mathematical calculation of the migration. The current migration model overestimates the migration. EFSA acknowledges that the migration model overestimates by at least a factor of 5. This applies for small molecules such as toluene. However, higher molecular weight contaminants such as benzophenone are even more overestimated. The reason for this overestimation is that the currently used migration model is based on a fixed activation energy of diffusion. Conversely, the curve of the maximum bottle wall concentration calculated using the current migration model increases much too gradually with the molecular weight. New developments in migration modelling consider more precisely the activation energies of diffusion. Consequently, using the new, more realistic diffusion coefficients influences significantly the EFSA evaluation criteria.	Alemania	plastic bottles
69	Recycling potential of post-consumer plastic packaging waste in Finland	2017	1. Dahlbo, Helena a, * 2. Poliakova, Valeria b, 1 3. Mylläri, Ville c 4. Sahimaa, Olli a 5. Anderson, Reetta	Plastic Packaging Recycling Quality Quantity Waste	Evaluation of recycling potential involves qualitative and quantitative assessment.•Manual sorting of mixed MSW plastics revealed 80% being monotype plastics.•Separately collected HDPE shows good potential for mechanical recycling.•Assessment of recycled material suitability for an application is case specific.•Major increase in plastic packaging recycling needed to impact the overall MSW recycling. Recycling of plastics is urged by the need for closing material loops to maintain our natural resources when striving towards circular economy, but also by the concern raced by observations of plastic scrap in oceans and lakes. Packaging industry is the sector using the largest share of plastics, hence packaging dominates in the plastic waste flow. The aim of this paper was to sum up the recycling potential of post-consumer plastic packaging waste in Finland. This potential was evaluated based on the quantity, composition and mechanical quality of the plastic packaging waste generated by consumers and collected as a source-separated fraction, within the mixed municipal solid waste (MSW) or within energy waste. Based on the assessment 86,000–117,000 tons (18 kg/person/a) of post-consumer plastic packaging waste was generated in	Finlandia	plastic bottles

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
70	Integrated optimization model and methodology for plastics recycling: Indian empirical evidence	2017	1. Sheriff, K.M. Mahaboob a 2. Subramanian, 3. Nachiappan b, * 4. Rahman, Shams c 5. Jayaram, Jayanth	Capacitated problem Location-allocation Product recovery Plastic industry India Recycling network	We develop a decision model to integrate three decisions pertaining to location, allocation, and routing of different varieties of recycled plastics. Our decision model allocates recycling collection points to the available centralized return center based on its capacity and ensures similar allocation to all facilities via optimal routing for trucks. The study addresses several pertinent questions such as how to deal with higher collection cost, how to develop a model that jointly considers operational cost reduction along with the achievement of higher environmental benefits, how to reduce sub optimization which is quite common when using standalone decision models, and what are the feasible ways to increase the utilization of collection facilities. We validate the model using data retrieved from a case study in India using a conventional decomposed modelling approach. Our findings demonstrate that the proposed integrated model reduces over ten percent of total recycling costs for both single and multiple products. The results also suggest managers to reduce variances in product quality levels in order to achieve substantial total costs reduction. In addition, to increase the plastic recycling returns and reduce the operational cost, managers need to cluster the customers based on the facility location and offer attractive incentives. •We develop a decision model to integrate three decisions pertaining to location, allocation, and routing.•We validate the model using case study in India for different varieties of recycled plastics.•We are able to reduce more than ten percent of total recycling costs for both single and multiple products.•Clustering the customers based on the facility location and offering attractive incentives will increase benefits	India	plastic bottles
71	Combined location and routing problems for designing the quality-dependent and multi-product reverse logistics network.	2014	1. Sheriff, K M M 2. Nachiappan, S 3. Min, H	reverse logistics; clustering; balanced location-allocation; multi-commodity flows	With a growing awareness of carbon footprints and their impact on environmental degradation, many firms hope to streamline their reverse logistics (RL) operations involving end-of-use products. However, managing end-of-use products can be extremely challenging due to inherent complexity involved in the collection, sorting, transhipment, and processing of these products. Despite numerous challenges, the efficient handling of these products can be a source of competitive advantages. In this regard, a plastic recycling industry in Southern India is no exception. This industry often copes with the problem of picking up recyclable plastic bottles using private collecting agents, transferring those bottles to the initial collection points (ICPs), and then transhipping and consolidating them at the centralized return centres (CRCs) for final shipments to the processing centres where these bottles were treated for recycling. This problem can be further complicated with the dilemma of finding the most ideal locations of ICPs and CRCs and the optimal routing of vehicles serving ICPs and CRCs such that the total RL cost is minimized. To aid the industry in dealing with such RL problems, we developed a mathematical model and then evaluated the performances of that model with the actual data obtained from a case study of the Indian company. Given a lack of efforts in combining the location-routing problem with the balanced allocation problem in the closed-loop supply chain network, the main contribution of this paper includes the simultaneous consideration of location, allocation, and routing decisions. In addition, this paper is one of the first to consider incentive payments, the quality level of products, and multiple types of products.	India	plastic bottles
72	Predictive model for the Dutch post-consumer plastic packaging recycling system and implications for the circular economy	2018	1. Brouwer, Marieke T. a, b, c 2. Thoden van Velzen, 3. Eggo U. b, c, * 4. Augustinus, Antje b, c 5. Soethoudt, Han c 6. De Meester, Steven d 7. Ragaert, Kim	Post-consumer waste Plastic packaging Sorting Mechanical recycling Circular economy Compositional analysis	A model of the Dutch post-consumer plastic packaging recycling system has been established.•Both the amounts of produced milled goods and their polymeric compositions can be predicted.•The end-of-life fates of 35 individual packaging types have been resolved.•The origins of the polymeric contaminants in recycled plastics have been determined.•Most contaminants originate from packaging components and are hence design-related. The Dutch post-consumer plastic packaging recycling network has been described in detail (both on the level of packaging types and of materials) from the household potential to the polymeric composition of the recycled milled goods. The compositional analyses of 173 different samples of post-consumer plastic packaging from different locations in the network were combined to indicatively describe the complete network with material flow analysis, data reconciliation techniques and process technological parameters. The derived potential of post-consumer plastic packages in the Netherlands in 2014 amounted to 341 Gg net (or 20.2 kg net.cap−1.a−1). The complete recycling network produced 75.2 Gg milled goods, 28.1 Gg side products and 16.7 Gg process waste. Hence the net recycling chain yield for post-consumer plastic packages equalled 30%. The end-of-life fates for 35 different plastic packaging types were resolved. Additionally, the polymeric compositions of the milled goods and the recovered masses were derived with this model. These compositions were compared with experimentally determined polymeric compositions of recycled milled goods, which confirmed that the model predicts these compositions reasonably well. Also the modelled recovered masses corresponded reasonably well with those measured experimentally. The model clarified the origin of polymeric contaminants in recycled plastics, either sorting faults or packaging components, which gives directions for future improvement measures.	Holanda	plastic bottles
73	Environmental evaluation of plastic waste management scenarios	2014	1. Rigamonti, L. a, * 2. Grosso, M. a 3. Møller, J. b 4. Martinez Sanchez, V. b 5. Magnani, S. a 6. Christensen, T.H. b	PlasticsLife cycle assessment Material recovery Energy recovery Municipal waste	was performed using the life cycle assessment methodology.•We made a sensitivity analysis about the marginal energy.•None of the examined scenarios emerged as the best option for all impact categories. The management of the plastic fraction is one of the most debated issues in the discussion on integrated municipal solid waste systems. Both material and energy recovery can be performed on such a waste stream, and different separate collection schemes can be implemented. The aim of the paper is to contribute to the debate, based on the analysis of different plastic waste recovery routes. Five scenarios were defined and modelled with a life cycle assessment approach using the EASEWASTE model. In the baseline scenario (P0) the plastic is treated as residual waste and routed partly to incineration with energy recovery and partly to mechanical biological treatment. A range of potential improvements in plastic management is introduced in the other four scenarios (P1–P4). P1 includes a source separation of clean plastic fractions for material recycling, whereas P2 a source separation of mixed plastic fraction for mechanical upgrading and separation into specific polymer types, with the residual plastic fraction being down-cycled and used for "wood items". In P3 a mixed plastic fraction is source separated together with metals in a "dry bin". In P4 plastic is mechanically separated from residual waste prior to incineration. A sensitivity analysis on the marginal energy was carried out. Scenarios were modelled as a first step assuming that marginal electricity and heat were based on coal and on a mix of fuels and then, in the sensitivity analysis, the marginal energy was based on natural gas. The study confirmed the difficulty to clearly identify an optimal strategy for plastic waste management. In fact none of the examined scenarios emerged univocally as the best option for all impact	Italia	plastic bottles
74	Applying value chain analysis to informal sector recycling: A case study of the Zabaleen.	2016	1. Jaligot, Remi1 2. Wilson, David C.1 waste@davidcwilson.com 3. Cheeseman, Christopher R.1 4. Shaker, Berti2 5. Stretz, Joachim2	Analytical tools Developing countries Informal sector Recycling Solid waste management Value chain analysis	A methodology has been developed to apply value chain analysis (VCA) to the informal recycling sector, and demonstrated using the Zabaleen in Cairo, Egypt as a case study. The VCA methodology provides a 'toolkit' comprising four stages. The first involves mapping the value chain and has been demonstrated using the recycling of polyethylene terephthalate (PET) bottles as the particular example. Stage 2 tabulates the value added at each step in the value chain; this has been demonstrated for different types of plastics as well as other recycled fractions. Stage 3 identifies and then applies a set of indicators for the development of the informal sector recycling value chain in order to address technical and socio-economic challenges. The indicators proposed are in three categories: connections in the value chain, waste valorisation and the enabling environment. Stage 4 involves developing a system dynamic map that shows connections between the indicators, and the stocks and flow variables in the value chain. In particular, it identifies the most highly connected indicators on which to focus interventions, as these are likely to have the greatest impact on the overall system. For the Zabaleen, these are improving the quality of waste inputs into the value chain through source segregation, optimising access to waste and upgrading recycling activities through access to finance and technical knowledge.	Inglaterra	plastic bottles

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
75	Recycling of plastic solid waste: A state of art review and future applications	2017	1. Singh, Narinder a 2. Hui, David b 3. Singh, Rupinder a 4. Ahuja, I.P.S. c 5. Feo, Luciano d 6. Fraternali, Fernando d,	Recycling Extrusion Mechanical testing Mechanical properties	Plastic solid waste (PSW) of polymers (like: high density polyethylene (HDPE), low density polyethylene (LDPE), Nylon etc.) is creating new challenges, which in today's scenario are major research concerns. A sharp rise has been observed in production of different products based on different plastic material. This huge increase in plastic commodities also increases the waste generation thus creating new challenges. Some researchers have reported work in the field of PSW management with different recycling methods. This paper compiles the different research work done by researchers in this field of recycling and progress in recovery and management of PSW by different methods (i.e. Primary, secondary, tertiary and quaternary) along with the various identification/separation techniques. Further, this paper reviews the effect on properties of virgin and recycled HDPE/LDPE/Nylon PSW with different reinforcements like sand, natural fibre, hemp fibre, metal powder etc	India	plastic bottles
76	Sustainable reverse logistics network design for household plastic waste.	2014	1. Bing, Xiaoyun 2. Bloemhof-Ruwaard, Jacqueline 3. Vorst, Jack	Household waste Mixed integer linear programming Network Plastics Reverse logistics Sustainability	Plastic recycling is a legal requirement and can yield environmental benefits. In the Netherlands, there is a complex network of various collection methods, separation centers, sorting centers and reprocessors. The first step of the recycling system, separating plastics from other waste, can occur within households (source-separation) or in separation centers (post-separation), making a difference in collection channel choice and technology requirements. The purpose of this paper is to provide decision support on choosing the most suitable combination of separation methods in the Netherlands. Decision support is given through optimized reverse logistics network design which makes the overall recycling system more efficient and sustainable, while taking into account the interests of various stakeholders (municipalities, households, etc.). A mixed integer linear programming (MILP) model, which minimizes both transportation cost and environmental impact, is used in this network design. The research follows the approach of scenario study; the baseline scenario is the current situation and other scenarios are designed with various strategic alternatives. Modeling is conducted by using a graphical optimization tool IBM LogicNet Plus 7.1. Comparing these scenarios, the results show that the current network settings of the baseline situation is efficient in logistics terms but has a potential to adapt to strategic changes, depending on the assumptions regarding availability of the required processing facilities to treat plastic waste. In some of the tested scenarios, a separate collection channel for Polyethylene Terephthalate (PET) bottles is cost efficient and saves carbon emission. Although the figures differ depending on the separation method choices of municipalities, our modeling result of all the tested scenarios shows a saving of more than 25 % carbon emission compared to the current network.	Holanda	plastic bottles
77	Teaching the Three R's: Reduce, Reuse, Recycle.	2012	1. Morgan, Emily1, emily@pictureperfectscience.com 2. Ansberry, Karen2,	Recycling (Waste, etc.) -- Study & teaching Activity programs in elementary education	The article presents lesson plans teaching elementary school children about recycling based on the books "A Plastic Bottle's Journey" by Suzanne Slade and illustrated by Nadine Wickenden and "Garbage, Waste, Dumps, and You" by Connie Colwell Miller	Estados Unid	Reduce, reuse, recicle
78	R+3R and PAYT in Solid Waste Management: A combined Approach.	2017	1. Athanikar, Shrikant1 shrikant_g03429@utp.edu.my 2. Kallimani, Vish1 vish.kallimani@petronas.com.my 3. Low Tan Jung1 lowtanjung@petronas.com.my	3R Intelligent system PAYT Solid Waste Waste management	Purpose: The main purpose is to manage the flow of waste in a more sustainable approach from economic, environmental and social point of view. Design/methodology/approach: Several promising approaches in waste management have been developed in the past few years, which includes 3R (Reduce, Reuse, Recycle) and PAYT (Pay-As-You-Throw). In addition, other innovative technological solutions have also been adopted to increase the overall efficiency of the service. Findings: Addition of another "R" (Refuse) to the 3R can help control generation of Municipal Solid Waste (MSW). Originality/value: The main purpose is to manage the flow of waste in a more sustainable approach from economic, environmental and social point of view. In cities thousands of tons of solid waste is generated daily. It is one of the most undesirable by-products of urban lifestyle which is growing even faster than the rate of urbanization. [	Malasia	Reduce, reuse, recicle
79	Corporate Memory: Design to better reduce, reuse and recycle	2016	1. Chun-CheHuangaHorng- 2. FuChuangbSan-YuanChena	Corporate Memory Product design knowledge Reducibility reusability recyclability (3R-abilities) Modularization Cloud computing	Extracting corporate knowledge and providing a repository for it have become essential because of the critical nature of strategic planning for the success of a business. Although Corporate Memory (CM) has been the subject of many studies in recent years, there are only few studies on the development of CM in relation to green product design, even though this is environmentally important. In particular, product design has gradually shifted to the goals of Reduce, Reuse and Recycle (3R-abilities). In this paper, so that industry can better achieve the 3R's, design knowledge is captured, generated, and modeled using CM architecture. In addition, a case is studied to validate the superiority and contribution of the proposed CM. This study is also relevant to other similar design problems that occur in many industries.	Taiwan	Reduce, reuse, recicle
80	Reduce, reuse, recycle: Acceptance of CO2-utilization for plastic products	2017	1. Juliavan Heek 2. MatrinArning 3. MartinaZiefle	Carbon capture & utilization (CCU)CO2 plastics Technology acceptance Conjoint analysis User diversity Risk perception Perceived knowledge & information about CCU	Global warming is a central threat for today's society caused by greenhouse gas emissions, mostly carbon dioxide emissions. Carbon dioxide capture and utilization (CCU) is a promising approach to reduce emissions and the use of expensive and limited fossil resources. Applying CCU, carbon dioxide (CO2) can be incorporated as raw material during the manufacture of plastic products. While most of the studies address technical feasibilities, hardly any systematic research on public perception and acceptance of those specific products exists so far. This study empirically investigates the acceptance of CCU plastic products (mattress as example). First, interviews with experts and lay people revealed critical acceptance factors (CO2 proportion, saving of fossil resources, disposal conditions, perceived health complaints). Their relative importance was detailed in two consecutive conjoint studies. Study 1 revealed disposal conditions and saving of fossil resources as essential for product selection, while the products' CO2 proportion was less important. In study 2, potential health complaints were integrated as well as individual levels of domain knowledge and risk perception, which significantly affected acceptance of CCU products. Recommendations concerning communication strategies for policy and industry were derived.	Alemania	Reduce, reuse, recicle
81	Interlinking Multiple Decision Variables Over Different Life Cycle Stages to Realize Effective Reuse and Recycling from a Strategic Viewpoint	2017	1.Shinsuke Kondoh 2.Hitoshi Komoto 3. Keijiro Masui	Reuserecycling product design capacity planning	Effective reuse and recycling of End-Of-Life (EOL) products is essential for improving resource efficiency. Many studies have been conducted for enabling effective reuse and recycling of EOL products. However, their individual application is not sufficient for the purposes because the main concerns dealt with in each method are strongly interrelated. The objective of the study is proposing a method for interlinking multiple factors over different life cycle stages so that multiple stakeholders involved in different life cycle stages can collaboratively find out more effective solutions than those individually achieved by each stakeholder from a strategic viewpoint.	Japon	Reduce, reuse, recicle
82	Does recyclable separation reduce the cost of municipal waste management in Japan	2017	1. Rosaria Chifaria1 2. SamueleLo Pianoa1 3. Shigeru Matsumotob1 4. TomohiroTasakic1	Municipal solid waste management cost Japan Source separation Treatment stage	Municipal solid waste (MSW) management is a system involving multiple sub-systems that typically require demanding inputs, materials and resources to properly process generated waste throughput. For this reason, MSW management is generally one of the most expensive services provided by municipalities. In this paper, we analyze the Japanese MSW management system and estimate the cost elasticity with respect to the waste volumes at three treatment stages: collection, processing, and disposal. Although we observe economies of scale at all three stages, the collection cost is less elastic than the disposal cost. We also examine whether source separation at home affects the cost of MSW management. The empirical results show that the separate collection of the recyclable fraction leads to reduced processing costs at intermediate treatment facilities, but does not change the overall waste management cost. Our analysis also reveals that the cost of waste management systems decreases when the service is provided by private companies through a public tender. The cost decreases even more when the service is performed under the coordination of adjacent municipalities.	Japon	Reduce, reuse, recicle
83	Habits and benefits of recycling solid waste among households in Kaduna, North West Nigeria	2017	1. Nelson T.A.Abd'RazackS.O. 2.MedayeseS.IShaibuB.MAdeleye	Environment Households Perception of environment Recycling benefits Recycling habits	Solid waste generation is an unavoidable product of man's activities, however, sustainable management of such waste is a challenge faced in many towns and cities in Nigeria. Many cities in Nigeria including Kaduna lack adequate plans and infrastructure required for efficient and sustainable management of municipal solid waste. This paper assesses the perception of households in Kaduna metropolis, north western Nigeria on the issue of solid waste recycling and benefits derived among households. Quantitative approach was used in data collection and stratified random sampling was used to select respondents. Random sampling was used to administer 500 questionnaires to the households. Descriptive statistics were used to analyze the perception and benefit of recycling and correlation of the benefits and habit of recycling was carried out. The result indicates that low income households are found to recycle their waste compared to high income households. The type of housing occupied by the respondents also indicated their recycling habits. This has greater effect on the general environmental management in the city. Correlation analysis indicated that there are three basic recycling habits among the people, which are: disposal, Segregation and Information gathering. The research indicated that four elements of perceptions about recycling benefit households in the city: Environmental Preservation, Resources and Cost Conservation, Monetary Reward and Environmental Awareness.	Nigeria	Reduce, reuse, recicle

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
84	From waste plastics to industrial raw materials: A life cycle assessment of mechanical plastic recycling practice based on a real-world case study	2017	1. Fu Gua Jianfeng 2. Wujie Zhange Peter 3. A.Summersa Philip Halla	Life cycle assessment Environmental impact Mechanical recycling Polypropylene Polyethylene Substitution	Mechanical recycling of waste plastics is an environmental solution to the problem of waste plastic disposal, and has already become a common practice in industry. However, limited information can be found on either the industralised plastic recycling or the recycled materials, despite the use of recycled plastics has already extended to automobile production. This study investigates the life cycle environmental impacts of mechanical plastic recycling practice of a plastic recycling company in China. Waste plastics from various sources, such as agricultural wastes, plastic product manufacturers, collected solid plastic wastes and parts dismantled from waste electric and electronic equipments, are processed in three routes with products end up in different markets. The results of life cycle assessments show that the extrusion process has the largest environmental impacts, followed by the use of fillers and additives. Compared to production of virgin plastics and composites, the mechanical recycling is proved to be a superior alternative in most environmental aspects. Substituting virgin plastic composites with recycled plastic composites has achieved the highest environmental benefits, as virgin composite production has an impact almost 4 times higher that of the recycled composite production in each ReCiPe endpoint damage factor. Sensitivity analysis shows that the coverage of collecting network contribute affect little to overall environmental impact, and centralisation plays an important role in reducing overall environmental impacts. Among the fillers and additives, impact modifiers account for the most significant contributions to the environmental impacts of recycled composites. This study provides necessary information about the existing industrialised plastic recycling practice, and recommendations are given. Research implications are presented with the purpose to achieve higher substitution rate and lower environmental impact.	China	Reduce, reuse, recicle
85	Drivers to Sustainable Plastic Solid Waste Recycling: A Review	2017	1. Bupe G.Mwanzaa 2. Charles Mbohwa	Drivers Plastics Recycling Sustainable Solid Waste Manufacturing	Waste recycling is a livelihood for the marginalized society in the developing economies and it is not surprising to find recycling of municipal solid waste (MSW) been carried out. Plastic waste is a waste type in MSW yet a number of challenges still exist in managing this waste type. A literature review was conducted to identify the key drivers to sustainable development of post-consumer packaging plastic waste recycling systems in developed and developing economies. A number of articles focusing on drivers or factors influencing sustainable management and recycling of solid waste and municipal solid waste were reviewed. Further analysis of the results indicated a number of drivers from the economic, environmental and social aspect as drivers to sustainable development of recycling systems for post-consumer packaging plastic solid waste.	South Africa	Reduce, reuse, recicle
86	The socially optimal recycling rate: Evidence from Japan	2014	1. Thomas C.Kinnamana 2. Takayoshi Shinkumab 3. Masashi Yamamotoc	Solid waste Recycling Environmental policy	This paper estimates the average social cost of municipal waste management as a function of the recycling rate. Social costs include all municipal costs and revenues, costs to recycling households to prepare materials estimated with an original method, external disposal costs, and external recycling benefits. Results suggest average social costs are minimized with recycling rates well below observed and mandated levels in Japan. Cost-minimizing municipalities are estimated to recycle less than the optimal rate. These results are robust to changes in the components of social costs, indicating that Japan and perhaps other developed countries may be setting inefficiently high recycling goals.	Japon	Reduce, reuse, recicle
87	Impacts of policy and market incentives for solid waste recycling in Dhaka, Bangladesh	2015	1. Anne Matterab Mehedi 2. Ahsanc Michelle 3.Marbachd Christian Zurbrügga	Solid waste management Recycling Policy incentives Market incentives Bangladesh Dhaka	Solid waste mismanagement in Dhaka, Bangladesh, illustrates a well-known market failure which can be summarized as: waste is a resource in the wrong place. Inorganic materials such as plastic or paper can be used to feed the demand for recycled materials in the industrial sector. Organic materials can be converted and used in the nutrient-starved agricultural sector which is currently heavily depending on chemical fertilizers. They are also a feedstock to generate renewable energy in the form of biogas for this energy-starved country relying on diminishing natural gas reserves and increasing import of coal. Reality however does not capitalize on this potential; instead the waste is a burden for municipal authorities who spend large portions of their budgets attempting to transport it out of the city for discharge into landfills. The major part of these materials still remains uncollected in the residential areas and is discarded indiscriminately in open spaces, polluting the residents' living environment including water, soil and air resources, in the city and beyond. Bangladeshi authorities have, to some extent, recognized this market failure and have developed policies to encourage the development of waste recycling activities. It is also important to note that this market failure is only partial: a large, mostly informal recycling sector has developed in Bangladesh, focusing on inorganic recyclables of market value. The fact that this sector remains largely informal means that these actors perceive significant barriers to formalization. Comparatively, the organic waste recycling sector is less driven by market mechanisms. Competition from chemical fertilizers and fossil fuels is fierce and hinders the development of market opportunities for compost and renewable energy. Nevertheless commercial production of compost and biogas from organic municipal waste is formalized and benefiting from policy incentives.	Bangladesh	Reduce, reuse, recicle
88	How successful are waste abatement campaigns and government policies at reducing plastic waste into the marine environment?	2017	1. Kathryn Willisab Clémentine 2. Maureaudc Chris Wilcoxa 3. Britta Denise Hardestya	Abatement campaigns Litter Policy Local government Waste effectiveness	Plastic production is increasing globally and in turn there is a rise of plastic waste lost into the coastal and marine environment. To combat this issue, there is an increase in policies that target specific types of plastic waste (such as microbeads and plastic shopping bags). Given that such anthropogenic waste have environmental impacts, reduce the tourism income of an area and result in human health issues, identifying effective abatement policies is imperative to reducing waste and litter before it enters the ocean. Within Australia, state and local governments employ a plethora of policies, campaigns and strategies to target abatement and reduce litter and waste inputs to the environment. Waste managers were interviewed from 40 local councils around Australia on waste abatement strategies and investments implemented in their council. Generalised linear models (GLMs) were used to compare outreach programs (such as 'Don't be a Tosser', Clean Up Australia and Bin your Butts cigarette campaign) and state-enacted policies (e.g. Plastic Shopping Bag Ban, Zero Waste Strategy and Recycling Strategy) aimed at targeting human behaviour to reduce waste. Investments in campaigns led to larger reductions of waste in the environment than did investment in policies. Illegal dumping, litter prevention, recycling, education and Clean Up Australia programs all significantly reduced waste along a council's coastline. Additionally, councils that invested in a coastal waste management budget had fewer littered or waste items on the coastline within their jurisdictions.	Australia	Reduce, reuse, recicle
89	Effective location models for sorting recyclables in public management	2014	1. Eli Angela 2. V.TosoDouglasAlem	Dynamic facility location problem Selective collection Recyclable materials Stochastic programming Minimax Conditional value-at-risk	The recycling of urban solid wastes is a critical point for the "closing supply chains" of many products, mainly when their value cannot be completely recovered after use. In addition to environmental aspects, the process of recycling involves technical, economic, social and political challenges for public management. For most of the urban solid waste, the management of the end-of-life depends on selective collection to start the recycling process. For this reason, an efficient selective collection has become a mainstream tool in the Brazilian National Solid Waste Policy. In this paper, we study effective models that might support the location planning of sorting centers in a medium-sized Brazilian city that has been discussing waste management policies over the past few years. The main goal of this work is to provide an optimal location planning design for recycling urban solid wastes that fall within the financial budget agreed between the municipal government and the National Bank for Economic and Social Development. Moreover, facility planning involves deciding on the best sites for locating sorting centers along the four-year period as well as finding ways to meet the demand for collecting recyclable materials, given that economic factors, consumer behavior and environmental awareness are inherently uncertain future outcomes. To deal with these issues, we propose a deterministic version of the classical capacity facility location problem, and both a two-stage recourse formulation and risk-averse models to reduce the variability of the second-stage costs. Numerical results suggest that it is possible to improve the current selective collection, as well as hedge against data uncertainty by using stochastic and risk-averse optimization models.	Brasil	Reduce, reuse, recicle

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
90	The consumption and recycling collection system of PET bottles: A case study of Beijing, China	2014	1. Hua Zhangab1 2. Zong-GuoWenab	PET bottle Recycling collection system Material flow analysis Financial flow	After studying the recycling collection system of polyethylene terephthalate (PET) bottles worldwide, the authors conducted an intercept survey in Beijing. Two separate questionnaires were issued, one questionnaire to PET bottle consumers and one to PET bottle recyclers. In this study, consumers are defined as people that consume PET-bottled beverages in their daily life. Recyclers were defined as those involved in the collection and recycling of PET bottles. These include scavengers, itinerant waste buyers, small community waste-buying depots, medium/large redemption depots, and recycling companies. In total, 580 surveys were completed, including 461 by consumers and 119 by recyclers. The authors found that consumption of PET bottles in Beijing was nearly 100,000 tonnes in 2012. Age, occupation, gender, and education were identified as significant factors linked to PET-bottled beverage consumption, while income was not a significant factor. 90% Of post-consumed PET bottles were collected by informal collectors (i.e., scavengers and itinerant waste buyers). The survey also found that nearly all PET bottles were reprocessed by small factories that were not designed with pollution control equipment, which allows them to offer higher prices for waste recyclable bottles. As Beijing is trying to build a formal recycling collection system for recyclables, subsidies should be given to the formal recycling sector rather than being charged land use fees, and attention should also be given to informal recyclers that make their living from the collection of recyclables. Informal and formal sectors may work together by employing the scavengers and itinerant waste buyers for the formal sectors. In addition to the recycling of PET bottles, concern should also be allocated to reduce consumption, especially among young people, as they, compared to other groups, have a stronger demand for PET-bottled beverages and will be the main body of society.	China	Reduce, reuse, recicle
91	Finding best practices for automotive glazing recycling: a network optimization model	2013	1. Romain Farel Bernard 2. Yannou Gwenola Bertoluci	Cost Benefit Analysis End of Life Vehicle Scenario Glass Recycling Stakeholder	In a recycling scheme such as the recycling of End of Life Vehicle (ELV) materials, the different stakeholders are expected to configure the operation process and product distribution to maximize their own profits. In many cases, however, these individual optimizations do not correspond to the maximal profit for the whole chain. In addition, financial autonomy must be carefully studied and controlled so as to ensure an economically viable recycling chain. This paper proposes a cost-benefit parameterized model for the ELV glazing recycling scheme, both for network configuration and material flow sizing. The model is mapped using real ground data from French industrial partners, and a linear programming technique is used to optimize the network for maximum profit. The sensitivity of this economic performance in different situations is analyzed by varying key variables of the model. Results show that, while the current glazing recycling situation is not economically viable, a national glazing recycling network could actually become beneficial for all stakeholders under certain conditions that are likely to appear in the near future. Several scenarios for the recycling network are simulated to determine the best practices for each of the network scenarios.	Francia	Reduce, reuse, recicle
92	Brechas entre hábito y actitud en el consumo de bebidas empacadas en PET, MedellínColombia1	2017	1. Guberney Muñetón Santa2 2. Juan Gabriel Vanegas López 3. Marisol Valencia Cárdenas 4. Jorge Aníbal Restrepo Morales	economía del consumidor economía ambiental consumo responsable regresión discreta regresión logística multinomial	Introducción. La huella ecológica que deja el consumo de alimentos y bebidas es un problema ambiental para lograr desarrollo sostenible de largo plazo. Un factor de cambio es la conciencia individual sobre el problema, en coherencia con hábitos de consumos amigables con el medio ambiente; sin embargo, esa coherencia tiene fracturas: hay brechas entre actitudes y hábitos que condicionan los resultados finales de la decisión. Objetivo. Analizar la brecha entre actitudes y hábitos de jóvenes consumidores de bebidas empacadas en PET en la ciudad de Medellín, Colombia, en el año 2016. Materiales y métodos. Se realizó un estudio cuantitativo con inferencias basadas en un modelo probabilístico. Se aplicaron 300 encuestas a adultos jóvenes de la ciudad de Medellín y se usaron dos modelos de regresión logísticos para analizar la brecha cognitiva entre actitudes y hábitos pro-ambientales. Resultados. Los resultados evidencian la presencia de una disonancia cognitiva que contradice la teoría de la elección racional, y reafirma la existencia de una brecha entre las actitudes y el comportamiento efectivo del consumidor. Conclusiones. Se manifiesta preocupación por el medio ambiente, pero no se ejercen acciones amigables con este. Se encuentra una falta de coherencia cognitiva entre la preocupación por el medio ambiente y el hábito de reciclar	Colombia	Botellas pet
93	DIAGNÓSTICO DEL IMPACTO DEL PLÁSTICO - BOTELLAS SOBRE EL MEDIO AMBIENTE: UN ESTADO DEL ARTE	2016	JOSE GUILLERMO GÓMEZ SERRATO	Botellas PET Impacto ambiental Estado del arte	El hombre forma parte del medio en el que vive, por su naturaleza se encuentra ligado a él, lo transforma para satisfacer sus necesidades, establece pautas para su valoración y cuidado. Entre hombre y medio ambiente existe una relación de dependencia en cuál es el medio el que determina en gran medida las formas de vida de cada persona. El ambiente está constituido por elementos naturales y artificiales, físicos, químicos, biológicos, actividades sociales culturales y sus correspondientes interrelaciones, transformado por la acción humana o natural que condiciona el desarrollo de la vida o su existencia. Según R.G. (2001), el ambiente se define como: El ambiente físico es el que proporciona los recursos necesarios para la supervivencia del hombre. Todas las empresas trabajan dentro del ambiente y reaccionan a él. El ambiente provee los recursos para la vida y la producción (alimentos, energía, aire, agua, materiales, tierra); también proporciona el "sumidero" o lugar de eliminación de los productos de desecho (p.21). "	Colombia	Botellas pet
94	La complejidad de la problemática ambiental de los residuos plásticos: Una aproximación al análisis narrativo de política pública en Bogotá	2012	Alejandra Téllez Maldonado	Residuos plásticos, Impacto ambiental, Política pública, Análisis narrativo de política pública	Los plásticos le dan innegables beneficios a la sociedad. Sin embargo, los residuos plásticos (RP) representan un problema ambiental global de creciente preocupación. Los océanos se convierten en "sopas de plástico", mientras que la cantidad de productos plásticos aumenta, al igual que sus residuos. Los impactos ambientales son acumulativos, de largo plazo y lejanos. La investigación describe beneficios y amenazas del plástico a nivel mundial y procura entender la complejidad de la problemática ambiental de los RP en la ciudad de Bogotá. La política pública busca cambiar comportamientos para lograr cambiar situaciones percibidas como problemáticas. Sin embargo, hay diversas concepciones culturales, sociales y económicas que entienden la problemática de diferentes maneras. La investigación analiza la actual política pública de Bogotá relacionada con el tema y los retos para adoptar medidas de prevención, mitigación, corrección y compensación. Realiza un análisis narrativo de política pública para identificar las diferentes concepciones de la problemática, que sugieren soluciones heterogéneas. Se genera un metanarrativa considerando las distintas posiciones. Finalmente, se señalan recomendaciones para pensar la política pública de manejo de RP.	Colombia	situación el plástico PET en Colombia
95	Redesign of a sustainable reverse supply chain under uncertainty: A case study	2017	MichaelFeitó-Cespón aWilliamSaracheb FrankPiedra-Jimenezc RobertoCespón-Castro	Supply Chain Network Design Reverse logistics Sustainability Plastic recycling	This paper presents a Stochastic Multi-Objective Mixed Integer Non-Linear Problem (SMOMINLP) to redesign the sustainable supply chain to recycle certain products. The model integrates economic, environmental and social objectives to support strategic decisions such as facility location, material flow design and transport selection. The environmental impact objective is calculated through the Life Cycle Assessment (LCA) methodology using the Eco-indicator 99 method. A multi-criteria programming approach algorithm to manage several objectives linked with stochastic programming to address uncertainty is developed in this investigation. In addition, to assess the solutions obtained and to reduce the uncertainty effect on decision-making, a performance indicator is proposed. Model feasibility has been tested in Cuba. In this case study, the redesign of a supply chain for plastic recycling is examined. The experimental results show supply chain configurations that improve sustainability performance.	Cuba	Logistica Inversa

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
96	Reverse logistics network design for product recovery and remanufacturing	2018	Liao, T	Reverse logistics network Modularity Bulk waste management Mixed integer nonlinear programming mode Hybrid genetic algorithm	Due to environmental concerns, reverse logistics now is becoming an important strategy to increase customer satisfaction. This research develops a generic mixed integer nonlinear programming model (MINLP) for reverse logistics network design. This is a multi-echelon reverse logistics model. It maximizes total profit by handling products returned for repair, remanufacturing, recycling, reuse, or incineration/landfill. A hybrid genetic algorithm (GA) is proposed to solve the problem. The designed model is validated and tested by using a real-life example of recycling bulk waste in Taoyuan City, Taiwan. Sensitivity analyses are conducted on various parameters to illustrate the capabilities of the proposed model. Post-optimality analysis and comparison show that the proposed model performs better than current reverse logistic operations and the proposed hybrid GA demonstrates the efficiency of solving the complex reverse logistics problem.	Taiwan	Reverse logistics network
97	Incorporating flexible capacity in the planning of a multi-product multi-echelon sustainable reverse logistics network under uncertainty	2018	Yu, Hao * Solvang, Wei Deng	Incorporating flexibility in sustainable reverse logistics network design. •Formulating mathematical model for decision support under uncertainty.• Different solution methods were tested, compared and discussed. •Results were analyzed for providing managerial implications.	With the focus on sustainable development, the value recovery from End-of-Life (EOL) and End-of-Use (EOU) products has been given considerable attention by the whole society. Reverse logistics is the process for value recovery and re-creation through a series of activities, i.e., repair, remanufacturing, recycling and energy recovery. However, due to the stochastic reverse product flow, unstable quality of used products, and the price fluctuation of recycled and remanufactured products, the planning of a reverse logistics system is more complex compared with that of a forward supply chain. In this paper, we propose a two-stage stochastic bi-objective mixed integer programming model for the network design problem of a multi-product multi-echelon sustainable reverse logistics system under uncertainty, which aims at providing a set of Pareto solutions between profitability and environmental performance. Furthermore, due to the heterogeneous nature, the processing operations performed at remanufacturing and recycling centers for different products are by no means identical. Different from the previous modelling efforts derived from a genetic “capacitated location problem”, this paper considers the impact from the system flexibility on sustainable reverse logistics network design. Thus, the model is formulated in two parallel ways with either efficiency-focused non-flexible capacity or effectiveness-focused flexible capacity. The experimental analysis illustrates that increasing environmental requirement will decrease the profitability of the reverse logistics system, while, increasing flexibility may yield positive impacts on both economic and environmental performance when the efficiency loss is kept at a proper level.	Noruega	Reverse logistics network
98	Designing and solving a reverse logistics network for polyethylene terephthalate bottles	2018	Mohammad Mahdi Paydara Marjan Olfatib	Reverse logistics Genetic algorithms Imperialist competitive algorithm Polyethylene terephthalate bottle Mixed-integer linear programming	In recent years, factors such as lack of valuable resources, economic importance, environmental concerns and increased customers' awareness caused the researchers to consider the design of a reverse logistics network. In this study, the process of collecting and remanufacturing polyethylene terephthalate bottles was considered. A mixed-integer linear programming model for a reverse logistics network was designed. A real case study of polyethylene terephthalate bottles was implemented in one of the northern cities of Iran to show the applicability of the model. The objective function was to minimize the total costs. In the current network model, new collection centers and remanufacturing centers can be opened. Also, the optimal number and location of the facilities along with the flow between them were determined. The obtained results clearly demonstrated that the proposed model is efficient and applicable. Moreover, this paper provided effective and reliable managerial implication solutions for decision makers of polyethylene terephthalate bottle reverse logistics network. Two meta-heuristic algorithms, namely the genetic algorithm and imperialist competitive algorithm, were applied to solve large-scale problems. The efficiency of the two proposed algorithms and the optimum solution of the LINGO software were compared in terms of the CPU time and objective function value. To achieve reliable results from these algorithms, parameter setting was utilized by the Taguchi method.	Iran	Reverse logistics network
99	A general reverse logistics network design model for product reuse and recycling with environmental considerations.	2016	Yu, Hao; Solvang, Wei	Carbon emissions Environmental impacts Facility location Mixed integer programming Multi-objective programming Network design Reverse logistics Transportation planning	Reverse logistics is believed to be one of the most promising solutions for capturing the remaining values from used products and has been extensively focused by both academics and practitioners during the past two decades. Conceptual framework, mathematical programming, and computational algorithms have been developed for decision-making at strategic, tactical, and operational levels of a reverse supply chain. In this paper, a novel idea for the design and planning of a general reverse logistics network is suggested and formulated through multi-objective mixed integer programming. The reverse logistics system is an independent network and comprises of three echelons for collection, remanufacturing, recycling, energy recovery, and disposal of used products. The mathematical model not only takes into account the minimization of system operating costs, but also considers minimization of carbon emissions related to the transportation and processing of used products, and the minimum rate of resource utilization is also required in order to minimize the waste of resources in landfill. Illustration, sensitivity analysis, and numerical experimentation are given to show the applicability and computational efficiency of the proposed model. This work provides an alternative approach to account both economic and environmental sustainability of a reverse logistics system. The result explicitly shows the trade-off between the costs and carbon emissions, cost effectiveness for improving environmental performance, and influences from resource utilization, all of which have great practical implication on decision-making of network configurations and transportation planning of a reverse logistics system. For future development of this work, suggestions are also given latter in this paper. [ABSTRACT FROM AUTHOR]	Noruega	Reverse logistics network
100	Reverse logistics network for municipal solid waste management: The inclusion of waste pickers as a Brazilian legal requirement	2015	Ferri, Giovane Lopes; Diniz Chaves, Gisele de Lorena; Ribeiro, Glaydston Mattos	Reverse logistics network Municipal solid waste Solid waste legislation Waste pickers	This study proposes a reverse logistics network involved in the management of municipal solid waste (MSW) to solve the challenge of economically managing these wastes considering the recent legal requirements of the Brazilian Waste Management Policy. The feasibility of the allocation of MSW material recovery facilities (MRF) as intermediate points between the generators of these wastes and the options for reuse and disposal was evaluated, as well as the participation of associations and cooperatives of waste pickers. This network was mathematically modelled and validated through a scenario analysis of the municipality of São Mateus, which makes the location model more complete and applicable in practice. The mathematical model allows the determination of the number of facilities required for the reverse logistics network, their location, capacities, and product flows between these facilities. The fixed costs of installation and operation of the proposed MRF were balanced with the reduction of transport costs, allowing the inclusion of waste pickers to the reverse logistics network. The main contribution of this study lies in the proposition of a reverse logistics network for MSW simultaneously involving legal, environmental, economic and social criteria, which is a very complex goal. This study can guide practices in other countries that have realities similar to those in Brazil of accelerated urbanisation without adequate planning for solid waste management, added to the strong presence of waste pickers that, through the characteristic of social vulnerability, must be included in the system. In addition to the theoretical contribution to the reverse logistics network problem, this study aids in decision-making for public managers who have limited technical and administrative capacities for the management of solid wastes.	Brazil	Reverse logistics network
101	Technical Paper: A reverse logistics network design	2015	AhmedAlshamsi AliDiabat	Mixed-integer linear programming Reverse logistics Facility location Transportation options	The area of reverse logistics (RL) has recently received considerable attention, due to a combination of environmental, economic and social factors. Reverse logistics refers to the series of operations that initiate at the consumer level with the collection of products and terminate with the re-processing of these products at remanufacturing facilities. In the current work, we propose a mixed-integer linear program (MILP) to address the complex network configuration of an RL system, which decides on the optimal selection of sites, the capacities of inspection centers and remanufacturing facilities. Furthermore, we introduce important transportation considerations, by providing the option of using in-house fleet as well as outsourcing option and this constitutes one of the main contributions of our work. In addition, we take into account the initial investment, which limits investments to be made on fleet or center expansion in subsequent time periods. The model is tested on a real-life case and results are reported. The current work holds significant practical implications, as it can provide useful insights to decision makers from both governmental and private entities regarding important strategic decisions pertaining to the design of reverse supply chains.	Emiratos Ar	Reverse logistics network

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
102	Design of a reverse logistics network for recyclable collection in Nova Scotia using compaction trailers	2016	Navin Chari , Uday Venkatadri Claver Diallo	Collection of recyclable waste; mixed integer linear programming (MILP); multiproduct capacitated vehicle routing problem; routing and scheduling; reverse logistics network design; geographical information systems (GIS)	As municipal and regional initiatives for the collection of recyclable products, such as plastic, metal, glass, paper, etc., are increasing across the globe, designing collection networks to minimize collection costs and reduce associated greenhouse gas emissions are becoming important. In this study, a two-phase mathematical decomposition model for the collection of multiple recyclable products using compaction trailers is presented. In the first phase of the decomposition, compaction trailer routes for each product type are generated by repeatedly solving instances of the routegeneration subproblem. In the second phase, a mixed integer linear programming is formulated for route selection and solved to determine the optimal combination of scenarios generated in the first phase to minimize total collection costs. A case study was conducted in the Canadian province of Nova Scotia using this approach for the collection of clear polyethylene terephthalate and aluminium cans. Numerical results show that the proposed optimization methodology can reduce current collection costs by 53.7%. The route configuration corresponding to this solution uses compaction trailers to pick-up approximately 85.1% of the two recyclable products investigated in this study, with the remaining collected using conventional trailers	Canada	Reverse logistics network
103	Reverse logistics network redesign under uncertainty for wood waste in the CRD industry.	2018	Trochu, Julien1 Julien.Trochu.1@ens.etsmtl.ca Chaabane, Amin1 Amin.Chaabane@etsmtl.ca Ouhimmou, Mustapha1 Mustapha.Ouhimmou@etsmtl.ca	CRD industry Environmental policy Network design Quality issues Uncertainty	This paper addresses the **reverse logistics network** (RLN) design problem under environmental policies targeting recycled wood materials from the construction, renovation and demolition (CRD) industry. The main objective is to determine the location and the capacities of the sorting facilities to ensure compliance with the new regulation and prevent the wood from being massively landfilled. We formulated the problem as a mixed-integer linear programming model (MILP) to minimise the total cost of the wood recycling process collected from CRD sites. The main contribution lies in the consideration of important uncertain factors such as supply sources locations, the available quantity of recycled wood at the collection sites, and the various quality grades of the collected wood. A scenario-based analysis is conducted to evaluate the impact of uncertainties on the RLN design. In addition, the proposed MILP model has been applied for a case study in the CRD industry within the province of Quebec, Canada. The results of this study show the adjustment of the **reverse logistics network** leads to the reduction of wood recycling cost due to the improved efficiency of sorting facilities and the economy of scale achieved under the new policy. Moreover, sorting facilities are now located near the CRD collection points and not close to landfilling site as for the actual situation. Finally, the study demonstrates that efforts to obtain accurate information about the supply sources locations and the expected wood quantity recovered from sorting facilities will guarantee a more efficient RLN redesign. [ABSTRACT FROM AUTHOR]	Canada	Reverse logistics network
104	Key Activities, Decision Variables and Performance Indicators of Reverse Logistics	2017	Reverse logistics performance indicators closed loop supply chain collection methods recovery options	Kuldip SinghSangwan	Reverse logistics is a great enabler for sustainable production and resource circulation. Its definition and scope are still evolving since early 1980s. But, collection, sorting/testing, recovery and redistribution are assumed as the basic four activities in reverse logistics. Unfortunately, many researchers assume reverse logistics by its literary meaning and plan the reverse logistic activities and take decisions based on the forward logistics or supply chain principles. There is hardly any academic research on the performance evaluation and decision variables for reverse logistics. This paper aims at developing the various activities, decision variables and performance indicators based on the four basic activities under reverse logistics. The three basic questions – who will collect from the customer, what is to be done on the collected products and where to send after recovery – interlinked with the activities at collection, sorting/testing and recovery centres will provide the basic activities, decision variables and key performance indicators of the reverse logistics. The location and capacity of various centres, types of networks, various recovery options, various methods of collection, and seamless integration with the forward logistics are the key decision variables. The performance indicators will be developed based on the activities and actions between the activities so that the performance indicators can be associated with the reverse logistics. It is expected that this conceptual framework of activities, decision variables and performance indicators will help the managers working in reverse logistics to take better and informed decisions.	India	Reverse logistics network
105	Closed-loop supply chains: What reverse logistics factors influence performance?	2016	SalvatoreCannellaa ManfrediBruccolerib Jose M.Framinana	Supply chain dynamics Reverse logistics Remanufacturing lead time Bullwhip effect Systematic literature review Simulation	This paper analyses the inventory and order flow dynamics in closed-loop supply chains (CLSCs). In this kind of supply chains the reverse flow of materials entering the system for recycling purposes complicates the way in which inventories should be managed and replenishment policies should be designed. Specifically, we analyse the relationships between some reverse logistics' factors (remanufacturing lead-time, return rate of recycled products, reverse order policy, and number of supply chain tiers) on the order and inventory variance amplification. We firstly perform a systematic literature review of the related studies. Secondly, by adopting a difference equation math approach and design of experiment we perform a robust what-if analysis of a CLSC under a variety of operational and market conditions. Results show that, ceteris paribus, CLSC outperforms a forward supply chain, both in mono-echelon and multi-echelon structures and under both stationary and turbulent market demands. Furthermore, reducing remanufacturing lead-time and promoting information transparency may be crucial to improve CLSC dynamics. Finally, we use the research findings to provide interesting managerial consideration about how to reduce unnecessary operational members' costs.	España	Reverse logistics network
106	Designing and solving a reverse logistics network for polyethylene terephthalate bottles	2018	Mohammad Mahdi Paydar Marjan Olfati	Reverse logistics Genetic algorithms Imperialist competitive algorithm Polyethylene terephthalate bottle Mixed-integer linear programming	In recent years, factors such as lack of valuable resources, economic importance, environmental concerns and increased customers' awareness caused the researchers to consider the design of a reverse logistics network. In this study, the process of collecting and remanufacturing polyethylene terephthalate bottles was considered. A mixed-integer linear programming model for a reverse logistics network was designed. A real case study of polyethylene terephthalate bottles was implemented in one of the northern cities of Iran to show the applicability of the model. The objective function was to minimize the total costs. In the current network model, new collection centers and remanufacturing centers can be opened. Also, the optimal number and location of the facilities along with the flow between them were determined. The obtained results clearly demonstrated that the proposed model is efficient and applicable. Moreover, this paper provided effective and reliable managerial implication solutions for decision makers of polyethylene terephthalate bottle reverse logistics network. Two meta-heuristic algorithms, namely the genetic algorithm and imperialist competitive algorithm, were applied to solve large-scale problems. The efficiency of the two proposed algorithms and the optimum solution of the LINGO software were compared in terms of the CPU time and objective function value. To achieve reliable results from these algorithms, parameter setting was utilized by the Taguchi method.	Iran	Reverse logistics network
107	A hybrid artificial bee colony for optimizing a reverse logistics network system	2017	Jun-qing Li Ji-dong WangQuan-ke PanPei-yong DuanHong-yan SangKai-zhou GaoYu Xue	Reverse logistics network Location allocation problem Artificial bee colony Neighborhood structure	This paper proposes a hybrid discrete artificial bee colony (HDABC) algorithm for solving the location allocation problem in reverse logistics network system. In the proposed algorithm, each solution is represented by two vectors, i.e., a collection point vector and a repair center vector. Eight well-designed neighborhood structures are proposed to utilize the problem structure and can thus enhance the exploitation capability of the algorithm. A simple but efficient selection and update approach is applied to the onlooker bee to enhance the exploitation process. A scout bee applies different local search methods to the abandoned solution and the best solution found so far, which can increase the convergence and the exploration capabilities of the proposed algorithm. In addition, an enhanced local search procedure is developed to further improve the search capability. Finally, the proposed algorithm is tested on sets of large-scale randomly generated benchmark instances. Through the analysis of experimental results, the highly effective performance of the proposed HDBAC algorithm is shown against several efficient algorithms from the literature.	China	Reverse logistics network

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
108	Diseño de una red de logística inversa: caso de estudio Usochicamocha - Boyacá	2017	Julián David Silva Rodríguez	Logística inversa; programación lineal; plaguicidas; retorno de envases ; disposición segura de envases; reciclaje	en el distrito de riego Usochicamocha del Departamento de Boyacá - Colombia, el cual enfrenta un problema a causa de la no devolución y recolección de la totalidad de los envases y empaques vacíos de plaguicidas que generan los agricultores. Debido a lo anterior, con la investigación se propone una configuración y funcionamiento de la red de logística inversa (LI) para la recolección, acopio y disposición final de los residuos de plaguicidas en dicha zona, para lo cual se desarrolla un modelo de programación lineal entera mixta con el fin de definir tanto las cantidades a recolectar y transportar a disposición final y evaluar la posibilidad de abrir nuevos centros de acopio. Los resultados del modelo matemático evidencian que, en promedio, se recolectan en cada finca 5 kg de residuos y que se envían 1106.58 kg a eliminación segura y 1292.31 kg a reciclaje.	Colombia	Reverse logistics network
109	A Location-Inventory-Routing Problem in Forward and Reverse Logistics Network Design	2016	Yuchi, Q., He, Z., Yang, Z., Wang, N	*VEHICLE routing problem *LOGISTICS *WAREHOUSES *MANUFACTURES *CUSTOMER satisfaction *TABU search algorithm	We study a new problem of location-inventory-routing in forward and reverse logistic (LIRP-FRL) network design, which simultaneously integrates the location decisions of distribution centers (DCs), the inventory policies of opened DCs, and the vehicle routing decision in serving customers, in which new goods are produced and damaged goods are repaired by a manufacturer and then returned to the market to satisfy customers' demands as new ones. Our objective is to minimize the total costs of manufacturing and remanufacturing goods, building DCs, shipping goods (new or recovered) between the manufacturer and opened DCs, and distributing new or recovered goods to customers and ordering and storage costs of goods. A nonlinear integer programming model is proposed to formulate the LIRP-FRL. A new tabu search (NTS) algorithm is developed to achieve near optimal solution of the problem. Numerical experiments on the benchmark instances of a simplified version of the LIRP-FRL, the capacitated location routing problem, and the randomly generated LIRP-FRL instances demonstrate the effectiveness and efficiency of the proposed NTS algorithm in problem resolution.	China	Reverse logistics network
110	Using cross-docking operations in a reverse logistics network design: a new approach	2016	Amirsaman Kheirkhah Saeid Rezaei	Reverse logistics Cross-docking operations Multi-echelon logistics network design Mixed-integer linear programming	Increasing development of competitive market has forced organizations to make great efforts in supplying, production and distribution of goods in their company so that they are capable of responding the customers different needs at the minimum delivery time and lowest cost. Cross-docking is a practical strategy in distribution cycle which has significantly attracted the attention of experts and industrialists in different areas. In this paper, the problem of designing a multi-echelon reverse logistics network with applying cross-docking centers is presented—as the first attempt to propose the new approach of using cross-docking centers in reverse logistics network. In this regard, a mixed-integer linear programming is utilized to model the problem for the goals of increasing shipment rate, decreasing fixed, variable costs and better management of returned products. Finally, the validation and sensitivity analysis are done by using the GAMS software. Considered the above requirements, the model facilitates objective-oriented reverse logistic performance.	Iran	Reverse logistics network
111	A perspective on the reverse logistics of plastic pallets in Canada	2018	Hassanzadeh Amin, S., Wu, H., Karaphillis, G	Plastic pallets Wooden pallets Reverse logistics Strengths, weaknesses, opportunities, threats (SWOT) Optimization	In this paper, the reverse logistics of plastic pallets in Canada, particularly in Nova Scotia, is investigated using different methods, including reviewing the literature and searching appropriate databases. Information such as the typical supply chains of plastic pallets, and the manufacturing processes of these products is gathered and analyzed. In addition, the best practices for the reverse supply chains of plastic pallets are identified and analyzed with a focus on recovery options, such as reusing, remanufacturing, and recycling. In addition, we find and analyze strengths, weaknesses, opportunities, and threat factors related to a specific company that is active in the wooden pallets industry and is establishing a plastic pallet reverse logistics system. Furthermore, we provide an optimization model that determines the best locations in a pallet reverse logistics network. Finally, managerial insights and recommendations are provided based on the analysis. The results of this paper have economic and environmental benefits for companies that are interested in the reverse logistics of plastic pallets.	Canada	Reverse logistics network
112	The paradox of packaging optimization – a characterization of packaging source reduction in the Netherlands	2013	Mariësse A.E.van Sluisveld	Source reductionWastePackaging	The European Council Directive 94/62/EC for Packaging and Packaging Waste requires that Member States implement packaging waste prevention measures. However, consumption and subsequently packaging waste figures are still growing annually. It suggests that policies to accomplish packaging waste prevention do not suffice, especially since developments are less insightful as these are part of a self-declaring compliance system. This study is aimed at expanding the understanding of packaging source reduction. We collected and evaluated 131 available options implemented in the Netherlands in the period 2005–2010. Lightweighting has been identified as the most frequently applied packaging source reduction method, indicating that the packaging industry prioritizes low-effort and familiar concepts, despite the dichotomy in efficacy.	Holanda	Reduce, reuse, recicle
113	MSW Biodrying in the Czech Republic	2015	Benešová, L., Pilnáček, V., &	Waste management	Waste management in the Czech Republic is currently facing a number of challenges. One of the most difficult is the treatment of municipal solid waste (MSW) because of the considerable heterogeneity of the material as a result of, among others, seasonal, household and social variability. MSW is managed according to two directives under European Union (EU) legislation: Directive 2008/98/EC which governs waste and Directive 1999/31/EC which governs the hierarchy of waste management. An upcoming change in these two directives calls for EU member states to increase reuse and recycling up to 70% by 2030 while decreasing landfilling as much as possible. One of the ways of meeting this goal is by biodrying MWS. Biodrying is employed to decrease the overall weight of the waste where the heat produced by the aerobic decomposition of the organic components dries the waste. Air can also be introduced into the waste to reduce humidity as part of the process. A study on the efficacy of biodrying was carried out employing a controlled air supply. A 1 m3 sample of freshly collected MSW weighing 30 kg was crushed to a grain size of approximately 30 mm and following selection via quartering, the sample was dried. The system was set up such that if the sample temperature dropped below 42°C, the air source would be activated and if the temperature reached above 45°C, it would be deactivated. Previous studies indicate that when air is supplied during the process from only one direction temperature and moisture gradients form within the waste, so samples in this study were collected from two layers of the reactor - the top and bottom. Initially, the humidity of the waste was 41.28%. After 257.5 hours, the	Republica Cl	Reduce, reuse, recicle
114	Distance and incentives matter: The separation of recyclable municipal waste	2017	Struk, M	Municipal solid wasteRecyclingS	The effects of two common systems of waste separation such as drop-off sites collection and kerbside collection, and the addition of an incentive program in small communities of the Czech Republic were investigated. Our findings suggest that the paper and plastics separation rates of total municipal solid waste are 7.7% for drop-off sites and 9.7% for kerbside collection system. If we add an incentive program, the separated paper and plastics rate can reach more than 17%, which represents a significant increase of the separation rate. Additionally, higher density of drop-off sites can also increase separation rate, but the effect is relatively low, and this approach is often not economical.	Republica Cl	Reduce, reuse, recicle
115	Influence of recycling programmes on waste separation behaviour	2017	Stoeva, K., & Alriksson, S	Theory of Planned BehaviourWa	To achieve high rates of waste reuse and recycling, waste separation in households is essential. This study aimed to reveal how recycling programmes in Sweden and Bulgaria influenced inhabitants' participation in separation of household waste. The waste separation behaviour of 111 university students from Kalmar, Sweden and 112 students from Plovdiv, Bulgaria was studied using the Theory of Planned Behaviour framework. The results showed that a lack of proper conditions for waste separation can prevent individuals from participating in this process, regardless of their positive attitudes. When respondents were satisfied with the local conditions for waste separation their behaviour instead depended on their personal attitudes towards waste separation and recycling.	Suecia	Reduce, reuse, recicle

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
116	Quantitative assessment of distance to collection point and improved sorting information on source separation of household waste	2015	Rousta, K., Bolton, K., Lund	Source separationHousehold was	The present study measures the participation of households in a source separation scheme and, in particular, if the household's application of the scheme improved after two interventions: (a) shorter distance to the drop-off point and (b) easy access to correct sorting information. The effect of these interventions was quantified and, as far as possible, isolated from other factors that can influence the recycling behaviour. The study was based on households located in an urban residential area in Sweden, where waste composition studies were performed before and after the interventions by manual sorting (pick analysis). Statistical analyses of the results indicated a significant decrease (28%) of packaging and newsprint in the residual waste after establishing a property close collection system (intervention (a)), as well as significant decrease (70%) of the miss-sorted fraction in bags intended for food waste after new information stickers were introduced (intervention (b)). Providing a property close collection system to collect more waste fractions as well as finding new communication channels for information about sorting can be used as tools to increase the source separation ratio. This contribution also highlights the need to evaluate the effects of different types of information and communication concerning sorting instructions in a property close collection system.	Suecia	Reduce, reuse, recicle
117	From linear to circular integrated waste management systems: A review of methodological approaches	2018	Cobo, S., Dominguez-Ramos	Integrated waste management sy	The continuous depletion of natural resources related to our lifestyle cannot be sustained indefinitely. Two major lines of action can be taken to overcome this challenge: the application of waste prevention policies and the shift from the classical linear Integrated Waste Management Systems (IWMSs) that focus solely on the treatment of Municipal Solid Waste (MSW) to circular IWMSs (CIWMSs) that combine waste and materials management, incentivizing the circularity of resources. The system analysis tools applied to design and assess the performance of linear IWMSs were reviewed in order to identify the weak spots of these methodologies, the difficulties of applying them to CIWMSs, and the topics that could benefit from further research and standardization. The findings of the literature review provided the basis to develop a methodological framework for the analysis of CIWMSs that relies on the expansion of the typical IWMS boundaries to include the upstream subsystems that reflect the transformation of resources and its interconnections with the waste management subsystems.	España	Economia Circular
118	Waste Management in Germany – Development to a Sustainable Circular Economy?	2016	Nelles, M., Gruenes, J., & M	Waste, Recovery, Recycling, Bio	The new German Closed Cycle Management Act is aimed to turn the waste management into a resource management. The realisation that waste can be a useful source of raw materials and energy is not new; metals, glass, and textiles have been collected before and put to new use. The waste management policy, which has been adapted in Germany over the past 20 years, is based on closed cycles and assigns disposal responsibilities to manufacturers and distributors of products. This has made people even more aware of the necessity to separate waste, led to the introduction of new disposal technologies, and increased recycling capacities. Today, 14 per cent of the raw materials used by the German industry are recovered waste. Modern closed cycle management contributes, with a share of approximately 20 per cent, to achieve the German Kyoto targets on the reduction of climate-relevant emissions.	Alemania	Reduce, reuse, recicle
119	Plastics Waste Management: Processing and Disposal	2016	Subramanian, M. N.	Libro, Plástico reciclado	Es un libro que habla sobre la administracion de los desechos plasticos	Estados Unid	Reduce, reuse, recicle
120	What are the most significant aspects of supporting the circular economy in the plastic industry?	2019	Simon, B	Circular economyPlasticBio-plas	Plastic is an indispensable material to our everyday life. However, some negative properties, for example, the durability under mild conditions, pose threat to the natural environment. The circular economy is an effort to mimic the loop-closing attribute of nature in anthropogenic systems. To bring plastics in such circularity in term of circular economy, a number of issues have to be handled from the quality of the recycled material to the acceptance of its use in new products. It is sometimes only a subtle step what we can do easily.	Alemania	Economia Circular
121	Qualitative comparison of polyethylene terephthalate flakes from various collection systems in Germany.	2017	Snell, H., Nassour, A., & Ne	Polyethylene terephthalate, recyc	In 2003, a deposit system for one-way packaging was introduced in Germany. Since that time, polyethylene terephthalate beverage packaging is collected through various collection systems, a deposit system, a reusable packaging system and the 'Green Dot' (the dual system) with the yellow bag. The manner of collection had a decisive influence on the quality of the generated recycled materials. The research at hand shows for the first time how the quality of polyethylene terephthalate flakes depends on the type of collection system. The results are based on a 14-year time frame, during which the quality of the polyethylene terephthalate flakes was examined using the different collection systems. The criterion used was the amount of contamination of polyethylene terephthalate flakes with various polymers, metals and other substances. Grain size and bulk density were also compared. The outcome shows that material from the deposit systems resulted in a better quality of polyethylene terephthalate (PET) flakes	Alemania	plastic bottles
122	Theinfluence of waste collections systems	2018	Mwanza, B. G., Mbohwa, C.	waste collection systemsrecovery	Different types of waste collection systems exist and the influence of each system on waste recovery differs. In order to sustainably recover resources from waste, it is cardinal to understand the different types of waste collection systems. In developed economies, different waste collection systems have been implemented to suit their context. As the developed economies pursue to recover resources from waste, it is vital that the influence of each collection system is understood. An extensive literature review was conducted on four different types of waste collection systems. Focus was paid on how each system has influenced resource recovery from the household perspective. The findings of the results are important to the waste management sector and manufacturing companies in the implementation of resource recovery systems and awareness programs	Sur Africa	Reduce, reuse, recicle
123	Effectiveness of deposit-refund systems for household waste in the Netherlands: Applying a partial equilibrium model	2019	Linderhof, V., Oosterhuis, F	Deposit-refund schemesEffective	Deposit-refund schemes (DRS) are basically a combination of two instruments: a tax on the purchase of a certain product, and a subsidy on the separate collection of the same product in its after-use stage. They can be efficient policy instruments to encourage reuse and recycling. However, empirical studies on impact of DRS systems on recycling rates are hardly done. In this paper, we applied the Fullerton-Wu model, a partial equilibrium model, to simulate the impact of introducing mandatory DRS for small electric appliances and batteries in the Netherlands. For small electric appliances, a deposit-refund rate of €5 to €15 per appliance would lead to an increase in the recycling rate (recycled appliances as a percentage of total amount of appliances disposed of) from 60.7% to 64.7% and 76.4% respectively. For batteries, a DRS would increase the recycling rate from 86.9% to between 87.2 and 89.2% depending on the deposit tax level ranging from €5 to €20 per kg and the price elasticities assumed (low and high). Obviously, the performance of DRS in terms of additional recycling is stronger in cases where current recycling rates are relatively low. Moreover, the pre-existence of an infrastructure for separate collection would make small white goods an interesting candidate for this instrument.	Holanda	Reduce, reuse, recicle
124	Deposit-Refund Systems in Practice and Theory	2013	Walls, M.	deposit-refund, waste disposal, re	A deposit-refund combines a tax on product consumption with a rebate when the product or its packaging is returned for recycling. Deposit-refunds are used for beverage containers, lead-acid batteries, motor oil, tires, various hazardous materials, electronics, and so on. In addition, researchers have shown that the approach can be used to address many other environmental problems beyond waste disposal – by imposing an upfront fee on consumption and subsidizing 'green' inputs and mitigation activities, a deposit-refund may be able to efficiently control pollution in much the same way as a Pigovian tax. Theoretical models have shown that alternative waste disposal policies such as virgin material taxes, advance disposal fee, recycled content standards, and recycling subsidies are inferior to a deposit-refund. These results have been corroborated in calibrated models of US waste and recycling. And in theoretical models that consider joint environmental problems and product design considerations, the deposit-refund continues to have much to recommend it as a component of an overall socially optimal set of policies. More empirical research into deposit-refund systems is needed, particularly the 'upstream' systems used for many products. In these systems, instead of consumers receiving refunds for returning products for recycling, processors or collectors of recyclables receive the refund. These systems may have lower transaction costs and better environmental outcomes than traditional downstream systems but more research is needed in this regard.	EEUU	Reduce, reuse, recicle

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
125	A cost-benefit analysis of a deposit–refund program for beverage containers in Israel	2010	Lavee, D.	Waste management	The paper presents a full cost-benefit analysis of a deposit–refund program for beverage containers in Israel. We examine all cost elements of the program – storage, collection, and treatment costs of empty containers, and all potential benefits – savings in alternative treatment costs (waste collection and landfill disposal), cleaner public spaces, reduction of landfill volumes, energy-savings externalities associated with use of recycled materials, and creation of new workplaces. A wide variety of data resources is employed, and some of the critical issues are examined via several approaches. The main finding of the paper is that the deposit–refund program is clearly economically worthwhile. The paper contributes to the growing body of literature on deposit–refund programs by its complete and detailed analysis of all relevant factors of such a program, and also specifically in its analysis of the savings in alternative waste management costs. This analysis reveals greater savings than are usually assumed, and thus shows the deposit–refund program to be highly efficient.	Israel	Reduce, reuse, recicle
126	Circular economy of plastic packaging: Current practice and perspectives in Austria	2018	Van Eygen, E., Laner, D., &	Resource managementWaste mai	Plastics, especially from packaging, have gained increasing attention in waste management, driving many policy initiatives to improve the circularity of these materials in the economy to increase resource efficiency. In this context, the EU has proposed increasing targets to encourage the recycling of (plastic) packaging. To accurately calculate the recycling rates, detailed information on the flows of plastic packaging is needed. Therefore, the aim of this paper is to quantitatively and qualitatively investigate the waste management system for plastic packaging in Austria in 2013 using material flow analysis, taking into account the used product types and the polymer composition. The results show that 300,000 ± 3% t/a (35 kg/cap·a) of waste plastic packaging were produced, mainly composed of large and small films and small hollow bodies, including PET bottles. Correspondingly, the polymer composition of the waste stream was dominated by LDPE (46% ± 6%), PET (19% ± 4%) and PP (14% ± 6%). 58% ± 3% was collected separately, and regarding the final treatment, 26% ± 7% of the total waste stream was recovered as re-granulates, whereas the rest was thermally recovered in waste-to-energy plants (40% ± 3%) and the cement industry (33% ± 6%). The targets set by the EU and Austria were reached comfortably, although to reach the proposed future target major technological steps regarding collection and sorting will be needed. However, the current calculation point of the targets, i.e. on the input side of the recycling plant, is not deemed to be fully in line with the overall objective of the circular economy, namely to keep materials in the economy and prevent losses. It is therefore recommended that the targets be calculated with respect to the actual output of the recycling process, provided that the quality of the output products is maintained, to accurately assess the performance of the waste management system.	Austria	Reduce, reuse, recicle
127	Procedimiento para el diseño de redes de distribución logística	2011	Chávez, E. R., García, Y. T.	procedimiento, diseño, redes, dis	La gestión logística se ha convertido en elemento de carácter estratégico en el mundo empresarial de la actualidad, dentro de la misma se destaca, por su impacto en los clientes e importancia económica, el subsistema de distribución. En la presente investigación se propone un instrumento cuyo principal objetivo es partiendo de un adecuado diagnóstico que incluye elementos geográficos, de tráficos, de tiempo y de costo, favorecer el diseño de sistemas de redes que contribuya a mejorar la efectividad de la distribución física, posibilitando ofrecer un elevado nivel de servicio con el mínimo costo posible para cumplir con los objetivos empresariales y lograr la satisfacción de los clientes.	Cuba	Reverse logistics network
128	DISEÑO DE UNA RED DE DISTRIBUCIÓN PARA UN PRODUCTO DE CONSUMO MASIVO, CON ENFOQUE DE REDES DE VALOR	2016	WILDER MIKE DE LA PAVA TORRES JAVIER EDUARDO CARDENAS	Logistica, redes de valor.	Esta investigación presenta la propuesta del diseño de una red de distribución para un producto de consumo masivo bajo el enfoque de redes de valor, debido a que la organización sufrió la contracción de la demanda alcanzando una reducción del 51% en menos tres años, así como el ajuste y cambios estructurales que se han venido llevando a cabo en ésta desde hace siete años. El problema se resuelve en tres fases mediante la aplicación del procedimiento basado en la técnica "Dividir y Conquistar", usando en la primera fase análisis multivariante con la técnica de clúster en dos etapas para la definición del número de centros de distribución, en la segunda fase la ubicación de instalaciones tomando en cuenta la demanda y geolocalización por medio del método de centro de gravedad y en la tercera fase el trazado de rutas de transporte mediante un algoritmo basado en la heurística del método de ahorros. Este proyecto presenta como principales aportes el diseño de una red de distribución terrestre a gran escala, llegando a más de 900 municipios del territorio colombiano, partiendo de la geolocalización de los clientes y su demanda, así como facilitar la planeación de la red en relación a la localización, números de centro de acopio y rutas de transporte, para lograr anticiparse a la dinámica del mercado.	Colombia	Reverse logistics network
129	REVERSE LOGISTICS AS A TREND OF XXI CENTURY – STATE OF ART	2020	Monika KOSACKA-OLEJNIK, Karolina WERNER-LEWANDOWSKA	literature review, reverse logistic	On the basis of legal, environmental, social, and economic factors, reverse logistics and closed-loop supply chain issues have attracted attention among both academia and practitioners. A growing number of publications is an expression of reverse logistics trend in the literature which has been lasted for around 40 years. Hence, a comprehensive literature review of recent and state-of-the-art papers is vessential to draw a framework of the past, and to support researchers in their works by indicating journals or adequate references. The aim of this paper was to prepare appropriate literature review procedure and following it to review all papers whose main topis was reverse logistics. The papers were analyzed and categorized to construct a useful foundation of past research with respect to the scale of number of research on reverse logistics, considering stages of reverse logistics development, targeted journals, main research centres and leading countries. Moreover there were reccommended the most valuable papers as references.	Ponzan	Reverse logistics network
130	Information management in Reverse logistics	2020	Marija Jović Jana Felicitas Schlierf Birte Heinen Edvard Tijan	Reverse logistics, Disruptive tech	This paper presents an overview of challenges related to information management in reverse logistics and an overview of selected disruptive technologies (Internet of Things, Blockchain, Cloud computing and Artificial intelligence) that improve information management and information flow in the reverse logistics chain. The theoretical background of reverse logistics and selected disruptive technologies is provided. The goal of this paper is to research how information management in reverse logistics can be improved through the use of disruptive technologies. The research problem results from increased costs and insufficient prediction accuracy in the reverse logistics chain	Belgrado	Reverse logistics network
131	Sistema de logística inversa para el desarrollo sostenible de un astillero	2020	Darío Arango-Serna, M., Alberto Valencia-Salazar, J., & Ruiz-Moreno, S.	cadena de suministro; disposició	Con el advenimiento de mercados globalizados donde aumentan los desperdicios derivados de procesos productivos y ante la evidente necesidad de adoptar medidas que disminuyan los impactos negativos asociados a su disposición final, la formulación de sistemas de logística inversa a medida de las empresas que permitan realizar una disposición responsable de los residuos maximizando la obtención de valor de estos ha sido objeto de estudio en los últimos años. El objetivo de este artículo es proponer un Sistema de Logística Inversa para un astillero que se enfoque en los residuos derivados de las operaciones de mantenimiento realizadas a embarcaciones bajo un enfoque sostenible. La metodología se basó en un análisis de la literatura científica en términos de logística inversa y sostenibilidad, al igual que la caracterización de los procesos en las instalaciones del astillero, desarrollando estrategias que soporten la implementación del sistema propuesto e indicadores que controlen su futura implementación	Colombia	Logistica Inversa

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
132	Responsabilidad social empresarial, logística inversa y desarrollo de la contabilidad de costos	2019	Ketty del Rocío Hurtado García	responsabilidad social empresarial; gestión logística; logística inversa; costos; contabilidad de costos	como importante estrategia a nivel organizacional, se vincula cada vez más con prácticas, funciones y procesos empresariales, como es el caso de la gestión logística. El objetivo del trabajo fue realizar un análisis sobre las relaciones teóricas entre la práctica de responsabilidad social empresarial y la logística inversa en las organizaciones, como base para el desarrollo de la contabilidad de costos. Se aplicaron métodos teóricos de investigación sobre la base de la consulta a fuentes bibliográficas actualizadas, lo que permitió sistematizar los principales contenidos relacionados con la temática. Se reconoció la sinergia entre los conceptos de responsabilidad social y logística inversa y las posibilidades de estudio existentes para el desarrollo de la contabilidad de costos. El análisis bibliográfico realizado permitió identificar las potencialidades de estudio del vínculo entre ambos conceptos, en el marco de la contabilidad de costos.	Ecuador	Logistica Inversa
133	Capacitated Remanufacturing Inventory Model Considering Backorder: A Case Study of Indonesian Reverse Logistics	2019	ILYAS MASUDIN , FATHIHAH RAUDHATTUL JANNAH, DANA MARSETIYA UTAMA, AND DIAN PALUPI RESTUPUTRI	Backorder, economic order quan	This paper develops the remanufacturing inventory model considering the storage capacity. The suggested model aims to minimize the total inventory cost (TIC). The model used the EOQ model, one of the basic inventory models in the supply chain. Numerical experiments and sensitivity analyses were carried out on models developed using the Lagrangean method. The existence of constraints in storage capacity can produce an optimal quantity of remanufacturing while minimizing inventory costs. This study also indicates that there is an impact between warehouse capacity, number of cycles, backorder costs, and the level of product collection on total inventory costs, and provides management implications that companies can make appropriate policies to minimize total inventory cost.	Indonesia	Reverse logistics network
134	Factors driving the implementation of reverse logistics: A quantified model for the construction industry	2018	Nicholas Chileshe a , Raufde	Influencing drivers Reverse logistics Quantification Strength Structural equation modeling Construction projects	In the light of increased environmental concerns and the unsustainability of current construction practices, 'reverse logistics' (RL) has emerged as a remedial strategy, whereby decommissioned buildings are salvaged and returned back through the value chain for recovery, refurbishment and reuse. The drivers that impact the uptake of RL are known, but if sustainability outcomes are to be enhanced, the strength of those drivers must be quantified in order to ascertain where efforts should be focused. This study aims to quantify the effects of known drivers on RL, and in so doing identify action items with the greatest potential to positively improve RL outcomes. RL drivers are culled from extant research, and categorized as economic, environmental, or social forces. A conceptual model is developed and tested against questionnaire results drawn from 49 expert respondents active in the South Australian construction industry. The results are analyzed using structured equation modeling. Economic and environmental drivers, such as the continuing relative high cost of salvaged items, along with expediency of cost, time and quality objectives overshadowing regulatory demands for use of such salvaged items, are shown to predict 34% of the variations in implementing RL. Of particular interest is the finding contradicting previous studies, showing that social drivers, such as perceived benefits from 'going green' had no significant impact. Thus, the road-map to improving RL outcomes lies in reducing costs of salvaged materials, augmenting environmental policies that promoted their use, and to initiate a regulatory framework to generate compliance. This insight will be of interest to industry policymakers and environmental strategists alike.	Australia	Reverse logistics network
135	Designing and solving a reverse logistics network for polyethylene terephthalate bottles	2018	Author links open overlay panelMohammad MahdiPaydaraMarjanOlfati	Reverse logisticsGenetic algorith	In recent years, factors such as lack of valuable resources, economic importance, environmental concerns and increased customers' awareness caused the researchers to consider the design of a reverse logistics network. In this study, the process of collecting and remanufacturing polyethylene terephthalate bottles was considered. A mixed-integer linear programming model for a reverse logistics network was designed. A real case study of polyethylene terephthalate bottles was implemented in one of the northern cities of Iran to show the applicability of the model. The objective function was to minimize the total costs. In the current network model, new collection centers and remanufacturing centers can be opened. Also, the optimal number and location of the facilities along with the flow between them were determined. The obtained results clearly demonstrated that the proposed model is efficient and applicable. Moreover, this paper provided effective and reliable managerial implication solutions for decision makers of polyethylene terephthalate bottle reverse logistics network. Two meta-heuristic algorithms, namely the genetic algorithm and imperialist competitive algorithm, were applied to solve large-scale problems. The efficiency of the two proposed algorithms and the optimum solution of the LINGO software were compared in terms of the CPU time and objective function value. To achieve reliable results from these algorithms, parameter setting was utilized by the Taguchi method.	Iran	Reverse logistics network
136	Reverse Logistics and Circular Economy - Working Together	2017	Dimitrova, V., & Gallucci, T	Circular economy, reverse logistics, Kraljic matrix, green market	In this study the authors have investigated which factors (economic and environmental) can incentive reverse logistics process and can create new market opportunities through the adoption of the principles of Circular economy. The tool for analysing these factors is the Kraljic matrix. This study has the goal to provide an innovative implementation of Kraljic matrix as methodological basis for the interrelation Circular economy- Reverse logistics. It is highlighted by different figures an original framework which could be used for the demonstration of how work together Circular economy and reverse logistics. There are also suggested the actions to take in order to develop green market strategies.	Iran	Reverse logistics network

No	Titulo	Año	Autor/es	Palabras claves	Resumen	Lugar	Palabra busqueda
137	Network configuration of a bottled water closed-loop supply chain with green supplier selection	2018	Pezhman Papen1 & Saman Hassanzadeh Amin1	Closed-loop supply chain . Bottled water industry. Multi-objective technique . Reverse logistics. Mixed-integer linear programming	A closed-loop supply chain is defined as the combination of both forward and reverse supply chains. However, it is in reverse supply chains that environmental issues are emphasized. In this research, a closed-loop supply chain network is designed and optimized to reduce the impact of bottled water production on the environment and maximize the total profit simultaneously. Unlike a general closed-loop supply chain network, in this network, the recycling centers are placed inside the manufacturers, in the same facility location, and the drop-off depots are parts of retailers in order to reduce environmental issues. In addition to designing and optimizing a bottled water closed-loop supply chain network, we also select the best suppliers based on some criteria, including cost, carbon footprint, on-time delivery, and quality. To achieve this aim, a multi-objective programming model and solution approaches are developed. The application of the proposed mathematical model is shown in Montreal, Canada, using real locations.	Iran	Reverse logistics network
138	Multiobjective Optimization for Multiperiod Reverse Logistics Network Design	2016	Shuang Li; Nengmin Wang; Tao Jia; Zhengwen He; Huigang Liang	Local search, location distribution, multiobjective optimization, nondominated sorting genetic algorithm II (NSGAII), reverse logistics network design.	In recent years, the ever-rising return streams for repair service have forced the electronics manufacturers to expand their reverse logistics capacities. However, most existing papers on the reverse logistics network design neglected the time sensitivity of the return flows. Moreover, most of these investigations were primarily concerned with the single objective problems of either minimizing the total cost or maximizing the profit. In this paper, we propose a biobjective mixed-integer linear programming model for the multiperiod design problem of a reverse logistics network for repair service. A multiperiod setting is taken into account to make the reverse logistics network flexible to accommodate the gradual changes in the capacity of the facilities and the network configuration. To solve the NP-hard problem with biobjective, we develop a hybrid evolutionary algorithm that combines nondominated sorting genetic algorithm II (NSGA-II) with a local search method. We compare the hybrid evolutionary algorithm with NSGA-II and ε-constraint method using numerical examples. The comparison results indicate that the hybrid evolutionary algorithm outperforms the NSGA-II in most cases. The ε-constraint method performs best for the small instances, but it cannot solve large instances within reasonable time. Finally, an extensive parametric analysis is conducted and several managerial insights are derived.	China	Reverse logistics network
139	Reverse Logistics Network Design for Industrial Waste in Industrial Clusters: Opportunities from Artificial Intelligence Technology	2019	PDF Bin Liao; Ting Wang	Industrial agglomeration , artificial intelligence , waste , reverse logistics network	In order to solve the problem of industrial waste accumulation in industrial agglomeration area, reduce the hidden dangers of manual operation, relying on intelligent logistics and artificial intelligence image recognition technology, this paper proposes a kind of “waste recycling-artificial intelligence identification-classification distribution activation” industrial waste “self-identification” - Cloud distribution mode. Based on the refinement of the process of each node of the logistics network, a multi-objective mathematical model of the artificial intelligence-industrial waste reverse logistics network with the lowest overall cost of the network system and the lowest waste landfill rate was established. And using Lingo software to solve the problem, the optimized location scheme of artificial intelligence recycling classification center is obtained.	Chima	Reverse logistics network
140	Sustainable reverse logistics network design for household plastic waste	2014	Bing, Xiaoyun; Bloemhof-Ruwaard, Jacqueline	Recicling, system, Netherlands	Plastic recycling is a legal requirement and can yield environmental benefits. In the Netherlands, there is a complex network of various collection methods, separation centers, sorting centers and reprocessors. The first step of the recycling system, separating plastics from other waste, can occur within households (source-separation) or in separation centers (post-separation), making a difference in collection channel choice and technology requirements. The purpose of this paper is to provide decision support on choosing the most suitable combination of separation methods in the Netherlands. Decision support is given through optimized reverse logistics network design which makes the overall recycling system more efficient and sustainable, while taking into account the interests of various stakeholders (municipalities, households, etc.). A mixed integer linear programming (MILP) model, which minimizes both transportation cost and environmental impact, is used in this network design. The research follows the approach of scenario study; the baseline scenario is the current situation and other scenarios are designed with various strategic alternatives. Modeling is conducted by using a graphical optimization tool IBM LogicNet Plus 7.1. Comparing these scenarios, the results show that the current network settings of the baseline situation is efficient in logistics terms but has a potential to adapt to strategic changes, depending on the assumptions regarding availability of the required processing facilities to treat plastic waste	Holanda	Reduce, reuse, recicle